50VZ/PZ
38VZ/PZ+40PZ

Vertical Air-Cooled Split-System Cooling Units and Heat Pumps

HFC-407C

CE

Installation, operation and maintenance instructions

CONTENTS

START-UP CHECKLIST **3**

PHYSICAL DATA **4**

ELECTRICAL DATA **5**

DIMENSIONS **6**
Service area, mm 13
Centre of gravity, mm 14
Weight distribution, kg 15
Repositioning unit air discharge 16

FAN PERFORMANCE **18**

SAFETY CONSIDERATIONS **26**

INSTALLATION **26**
Siting the unit 26
Ductwork (indoor air discharge) 27
Condensate drainage 27

ELECTRICAL CONNECTIONS **28**

Refrigerant line connections (38VZ/PZ and 40PZ) 29
Refrigerant line selection 29
Sizing 30

REFRIGERANT CHARGE **31**

START-UP **31**

REFRIGERANT SYSTEM DESCRIPTION **31**

COMPRESSOR REPLACEMENT **31**

DESCRIPTION OF UNIT PROTECTION DEVICES **32**
Operating limits 32

OPTIONS AND ACCESSORIES **32**
Hot water heating coil 32
Electric resistance heaters 33

GENERAL MAINTENANCE **34**

SERVICE **34**

TRANSFORMATION TO SPLIT SYSTEM (50VZ/PZ units) **35**

FINAL RECOMMENDATIONS **35**

TROUBLESHOOTING CHART **36**

START-UP CHECK LIST Start up date: .....

Equipment sold by: ..... Contract No: .....

Installed by: ..... Contract No: .....

Site address: .....

Equipment type and serial No: 50VZ/PZ.....

38VZ/PZ.....

40PZ.....

ELECTRICAL DATA:

Supply voltage Ph 1: . ..... Volts Ph 2: ..... Volts Ph 3 .....Volts

Nominal voltage: ..... Volts % network voltage: .....

Current draw Ph 1: ..... Amperes Ph 2: ..... Amperes Ph 3: ..... Amperes

Control circuit voltage: ..... Volts Control circuit fuse: ..... Amperes

Main circuit breaker rating: .....

PHYSICAL DATA:

Outdoor unit :

Entering air temp.: ..... °C

Leaving air temp.: ..... °C

Pressure drop (air): ..... kPa

Discharge air pressure: ..... Pa

Fan motor input: Ph. 1: ..... Volts

Ph. 2: ..... Volts

Ph. 3: ..... Volts

Indoor unit:

Entering air temp.: ..... °C

Leaving air temp.: ..... °C

Pressure drop (air): ..... kPa

Discharge air pressure: ..... Pa

Fan motor input: Ph. 1: .....Volts

Ph. 2: .....Volts

Ph. 3: .....Volts

SAFETY DEVICE SETTING:

High pressure switch:	cut-out: ..... kPa	cut-in: ..... kPa
Low pressure switch:	cut-out: ..... kPa	cut-in: ..... kPa
Step controller:	cut-out 1st step: ..... °C	cut-in 1st step: ..... °C
	cut-out 2nd step: ..... °C	cut-in 2 nd step: ..... °C

Oil level: .....

Oil visible in sight glass? .....

ACCESSORIES:

Commissioning engineer (name): .....

Customer agreement

Name: ..... Date: .....

Remarks:

Note: Complete this start-up list at the time of installation

Table 1 - Physical data

50VZ (40PZ/38VZ)		015	025	030	031	040	045	055	065	075
Nom. cooling capacity*	kW	14.60	22.74	29.75	27.80	35.05	45.21	53.90	63.89	74.35
Unit weight	kg									
50VZ		230	390	402	410	618	842	894	943	1033
40PZ		78	140	150	150	230	297	317	335	365
38VZ		152	250	252	260	388	545	577	608	668
Compressor		Hermetic reciprocating				Scroll				
Oil charge	l	1.8	3.9	3.9	1.8 x 2	4 x 2	4 x 2	4 x 2	4 x 2	6.6 x 2
Oil type		Maneurop 160PZ				Mobil EAL Arctic 22CC				Maneurop 160SZ
Refrigerant		R-407C								
Refrigerant charge**	kg	3.80	6.62	7.43	3.80 x 2	4.70 x 2	6.70 x 2	8.80 x 2	9.40 x 2	11.0 x 2
Evaporator section (40PZ)		Copper tubes, aluminium fins								
Face area	m^2	0.34	0.64	0.69	0.69	0.84	1.10	1.10	1.34	1.34
Rows...fins/m		3...551	4...472	4...472	4...472	4...472	4...551	6...472	6...551	6...551
Test pressure	bar	30	30	30	30	30	30	30	30	30
Condenser section (38VZ)		Copper tubes, aluminium fins								
Face area	m^2	0.49	0.87	0.87	0.87	1.19	1.73	1.73	2.12	2.12
Rows...fins/m		5...551	4...551	5...551	5...551	5...551	5...551	6...551	6…551	6...551
Test pressure	bar	30	30	30	30	30	30	30	30	30
Evaporator fan (40PZ)		Double inlet centrifugal type								
Quantity		1	2	2	2	2	2	2	2	2
Nominal air flow	l/s	960	1490	1690	1690	2190	2640	2910	3140	3530
Air flow range	l/s	768-1152	1192-1788	1352-2028	1352-2028	1752-2628	2112-3168	2328-3492	2512-3768	2824-4236
Nominal static pressure (dry/wet)	Pa	90/70	90/70	120/100	120/100	140/120	170/150	180/160	200/180	210/180
Condenser fan (38VZ)		Double inlet centrifugal type								
Quantity		1	2	2	2	2	2	2	2	2
Nominal air flow	l/s	1470	3020	2780	2780	3610	4580	5080	6030	6890
Air flow range	l/s	1176-1764	2416-3624	2224-3336	2224-3336	2888-4332	3664-5496	4064-6096	4824-7236	5512-8268
Nominal static pressure	Pa	50	50	60	60	60	75	100	100	100
Air filter		Filter class M1								
Quantity		1	2	2	2	2	3	3	3	3
Width x height	mm	800x443	596x540	596x590	596x590	716x590	676x587	616x587	749x587	749x587
Thickness	mm	15	15	15	15	15	15	15	15	15
Condensing unit 38VZ* **		**015**	**025**	**030**	**031**	**040**	**045**	**055**	**065**	**075**
Nom. cooling capacity	kW	13.47	19.97	27.02	24.80	32.54	40.30	48.21	59.13	71.10

* Based on an outdoor air temperature of 35°C db and an indoor air temperature of 19°C wb
** The refrigerant charge given is for the complete system, but excludes the connection lines.
*** Based on an outdoor air dry bulb temperature of 35°C and a dewpoint suction temperature of 7°C.

50PZ (40PZ/38PZ)		015	025	030	031	040	045	055	065	075
Nom. cooling capacity*	kW	13.42	21.81	28.50	27.70	34.36	43.60	52.51	61.94	72.58
Nom. heating capacity**	kW	15.76	25.02	30.58	30.20	39.15	50.18	57.43	66.60	83.06
Unit weight	kg									
50PZ		238	400	412	427	638	864	919	968	1058
40PZ		78	140	150	150	230	297	317	335	365
38PZ		160	260	262	277	408	567	602	633	693
Compressor		Hermetic reciprocating				Scroll				
Oil charge	l	1.8	3.9	3.9	1.8 x 2	4 x 2	4 x 2	4 x 2	4 x 2	6.6 x 2
Oil type		Maneurop 160PZ				Mobil EAL Arctic 22CC				Maneurop 160SZ
Refrigerant		R-407C								
Refrigerant charge***	kg	4.02	7.20	7.71	3.94 x 2	5.40 x 2	7.50 x 2	9.20 x 2	9.50 x 2	11.20 x 2
Indoor section (40PZ)		Copper tubes, aluminium fins								
Face area	m^2	0.34	0.64	0.69	0.69	0.84	1.10	1.10	1.34	1.34
Rows...fins/m		3...551	4...472	4...472	4...472	4...472	4...551	6...472	6...551	6...551
Test pressure	bar	30	30	30	30	30	30	30	30	30
Outdoor section (38PZ)		Copper tubes, aluminium fins								
Face area	m^2	0.49	0.87	0.87	0.87	1.19	1.73	1.73	2.12	2.12
Rows...fins/m		5...551	4...551	5...551	5...551	5...551	5...551	6...551	6…551	6...551
Test pressure	bar	30	30	30	30	30	30	30	30	30
Indoor fan (40PZ)		Double inlet centrifugal type								
Quantity		1	2	2	2	2	2	2	2	2
Nominal air flow	l/s	960	1490	1690	1690	2190	2640	2910	3140	3530
Air flow range	l/s	768-1152	1192-1788	1352-2028	1352-2028	1752-2628	2112-3168	2328-3492	2512-3768	2824-4236
Nominal static pressure (dry/wet)	Pa	90/70	90/70	120/100	120/100	140/120	170/150	180/160	200/180	210/180
Outdoor fan (38PZ)		Double inlet centrifugal type								
Quantity		1	2	2	2	2	2	2	2	2
Nominal air flow	l/s	1470	3020	2780	2780	3610	4580	5080	6030	6890
Air flow range	l/s	1176-1764	2416-3624	2224-3336	2224-3336	2888-4332	3664-5496	4064-6096	4824-7236	5512-8268
Nominal static pressure	Pa	50	50	60	60	60	75	100	100	100
Air filter		Filter class M1								
Quantity		1	2	2	2	2	3	3	3	3
Width x height	mm	800x443	596x540	596x590	596x590	716x590	676x587	616x587	749x587	749x587
Thickness	mm	15	15	15	15	15	15	15	15	15

* Based on an outdoor air temperature of 35°C db and an indoor air temperature of 19°C wb
** Based on an outdoor air temperature of 6°C wb and an indoor air temperature of 20°C db.
*** The refrigerant charge given is for the complete system, but excludes the connection lines.

Table 2 - Electrical data

50VZ (40PZ/38VZ)		015		025		030		031		040		045		055		065		075	
Nominal voltage ±10%*	**V**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**
Nominal power input**	kW	7.3	7.3	11.1	11.1	14.0	14.0	14.6	14.6	18.1	18.1	21.4	21.4	25.4	25.4	30.0	30.0	37.6	37.6
Nominal current drawn**	A	23.8	13.8	33.1	19.1	39.4	22.8	44.9	26.0	52.6	30.4	64.9	37.5	74.3	43.0	87.8	50.8	122.1	67.1
Effective power input	kW	6.8	6.8	10.2	10.2	13.0	13.0	13.6	13.6	16.8	16.8	19.0	19.0	22.2	22.2	26.1	26.1	33.1	33.1
Effective current drawn	A	21.6	12.5	30.5	17.6	37.0	21.4	41.9	24.2	56.5	32.6	57.9	33.4	70.0	40.5	76.6	44.3	102.0	59.0
Starting current	A	139.5	80.0	174.1	106.3	219.0	133.3	165.9	95.3	235.2	134.0	278.4	156.7	329.1	187.8	384.5	219.0	450.1	256.0
Maximum power input***	kW	7.9	7.9	12.2	12.2	15.5	15.5	16.1	16.1	21.8	21.8	25.2	25.2	29.6	29.6	35.0	35.0	44.2	44.2
Maximum current drawn***	A	24.2	14.0	35.5	20.5	43.2	25.0	49.5	28.6	66.6	38.5	73.1	42.2	88.8	51.3	99.7	57.6	129.5	74.8

Condensing unit 38VZ		015		025		030		031		040		045		055		065		075	
Nominal voltage ±10%*	**V**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**
Nominal power input⁺	kW	6.5	6.5	10.1	10.1	12.8	12.8	13.2	13.2	16.7	16.7	19.4	19.4	23.0	23.0	26.9	26.9	34.7	34.7
Nominal current drawn⁺	A	20.6	11.9	29.9	17.3	36.6	21.2	37.8	21.9	56.2	32.5	59.4	34.3	72.7	42.0	79.1	45.7	106.6	61.6
Effective power input	kW	6.3	6.3	9.6	9.6	12.3	12.3	12.7	12.7	16.0	16.0	18.3	18.3	21.4	21.4	25.0	25.0	32.5	32.5
Effective current drawn	A	20.1	11.6	28.5	16.5	35.4	20.4	36.4	21.1	54.0	31.2	56.0	32.4	67.6	39.1	73.5	42.5	99.9	57.7
Starting current	A	136.7	78.4	170.1	104.0	214.1	130.5	161.1	92.5	226.9	129.2	270.9	151.2	319.2	180.9	372.2	211.9	434.2	246.8
Maximum power input⁺⁺	kW	7.7	7.7	11.5	11.5	14.9	14.9	15.3	15.3	20.6	20.6	24.0	24.0	29.1	29.1	33.8	33.8	43.9	43.9
Maximum current drawn⁺⁺	A	23.5	13.6	33.5	19.4	41.4	23.9	42.5	24.5	62.9	36.4	69.4	40.1	87.4	50.5	96.2	55.6	128.5	74.3

* All units are built for 3-phase, 50 Hz supply.
** Based on an outdoor air dry bulb temperature of 35°C and an indoor air wet bulb temperature of 19°C.
*** Based on an outdoor air dry bulb temperature of 46°C and an indoor air wet bulb temperature of 21°C.
⁺ Based on an outdoor air dry bulb temperature of 35°C and a dewpoint suction temperature of 7°C.
⁺⁺ Based on an outdoor air dry bulb temperature of 46°C and a dewpoint suction temperature of 12°C.

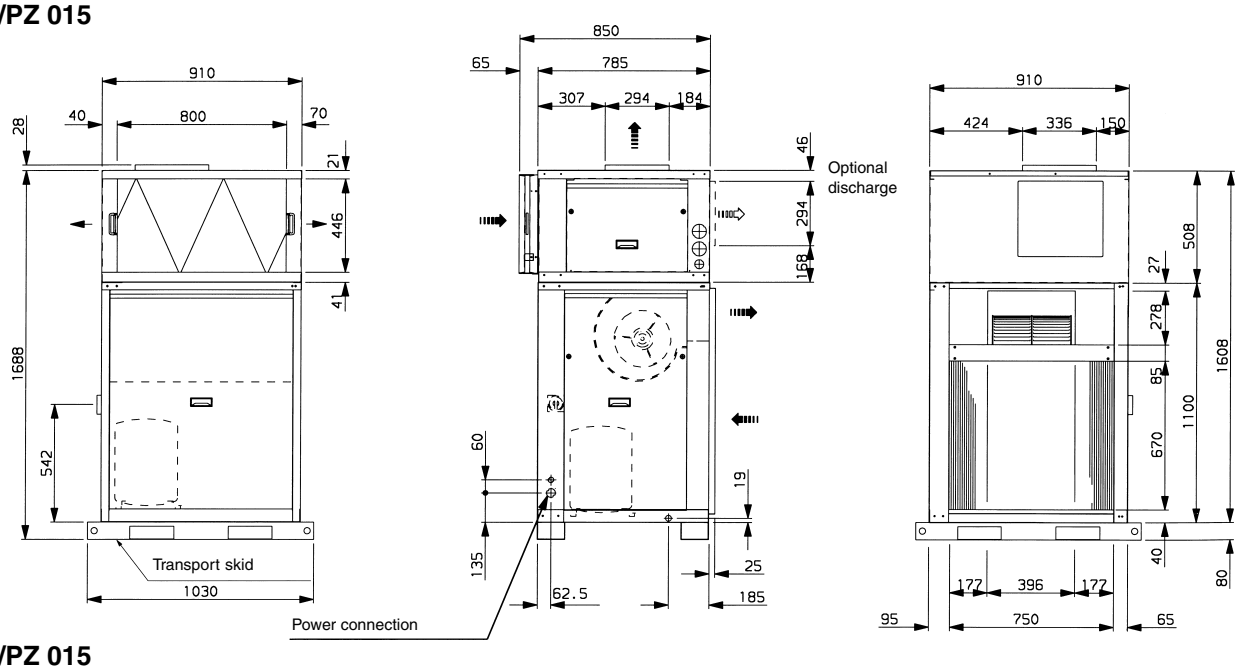
50PZ (40PZ/38PZ)		015		025		030		031		040		045		055		065		075	
Nominal voltage ±10%*	**V**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**	**230**	**400**
Nominal power input	kW																		
Cooling**		7.2	7.2	11.2	11.2	13.6	13.6	14.6	14.6	18.1	18.1	21.6	21.6	25.4	25.4	30.2	30.2	38.5	38.5
Heating***		6.6	6.6	11.1	11.1	12.4	12.4	12.7	12.7	17.5	17.5	20.8	20.8	23.7	23.7	27.1	27.1	34.3	34.3
Nominal current drawn	A																		
Cooling**		23.7	13.7	33.2	19.2	38.4	22.2	46.0	26.6	55.0	31.8	66.1	38.2	73.3	42.4	88.0	50.9	118.5	68.6
Heating***		22.5	13.0	33.2	19.2	35.8	20.7	41.5	24.0	52.2	30.2	63.7	36.8	70.7	40.9	82.0	47.4	109.8	63.5
Effective power input	kW																		
Cooling		6.7	6.7	10.3	10.3	12.5	12.5	13.6	13.6	16.8	16.8	19.1	19.1	22.2	22.2	26.3	26.3	34.1	34.1
Heating		6.1	6.1	10.3	10.3	11.4	11.4	11.6	11.6	16.2	16.2	18.4	18.4	20.5	20.5	23.2	23.2	29.8	29.8
Effective current drawn	A																		
Cooling		22.1	12.7	30.5	17.7	35.3	20.4	42.8	24.8	51.0	29.5	59.4	33.8	64.1	37.1	76.6	44.3	105.0	60.8
Heating		20.8	12.0	30.8	17.8	32.9	19.0	37.9	21.9	48.3	28.0	56.4	32.6	61.2	35.4	70.2	40.6	95.4	55.2
Starting current	A	139.5	80.0	174.1	106.3	219.0	133.3	165.9	95.3	235.2	134.0	278.4	156.7	329.1	187.8	384.5	219.0	450.1	256.0
Maximum power input	kW																		
Cooling⁺		8.0	8.0	12.4	12.4	15.2	15.2	16.3	16.3	21.6	21.6	25.3	25.3	30.4	30.4	34.9	34.9	44.5	44.5
Heating⁺⁺		7.5	7.5	13.1	13.1	15.8	15.8	14.4	14.4	20.3	20.3	23.7	23.7	28.1	28.1	32.8	32.8	41.6	41.6
Maximum current drawn	A																		
Cooling⁺		26.3	15.2	36.8	21.3	42.9	24.8	51.4	29.7	65.6	37.9	77.4	44.7	87.7	50.7	101.7	58.8	137.0	79.3
Heating⁺⁺		25.6	14.8	39.2	22.7	45.6	26.4	47.1	27.2	60.6	35.0	72.6	41.9	83.8	48.5	99.2	57.4	133.2	77.0

* All units are built for 3-phase, 50 Hz supply.
** Based on an outdoor air dry bulb temperature of 35°C and an indoor air wet bulb temperature of 19°C.
*** Based on an outdoor air wet bulb temperature of 6°C and an indoor air dry bulb temperature of 21°C.
⁺ Based on an outdoor air dry bulb temperature of 46°C and an indoor air wet bulb temperature of 21°C.
⁺⁺ Based on an outdoor air dry bulb temperature of 18°C.

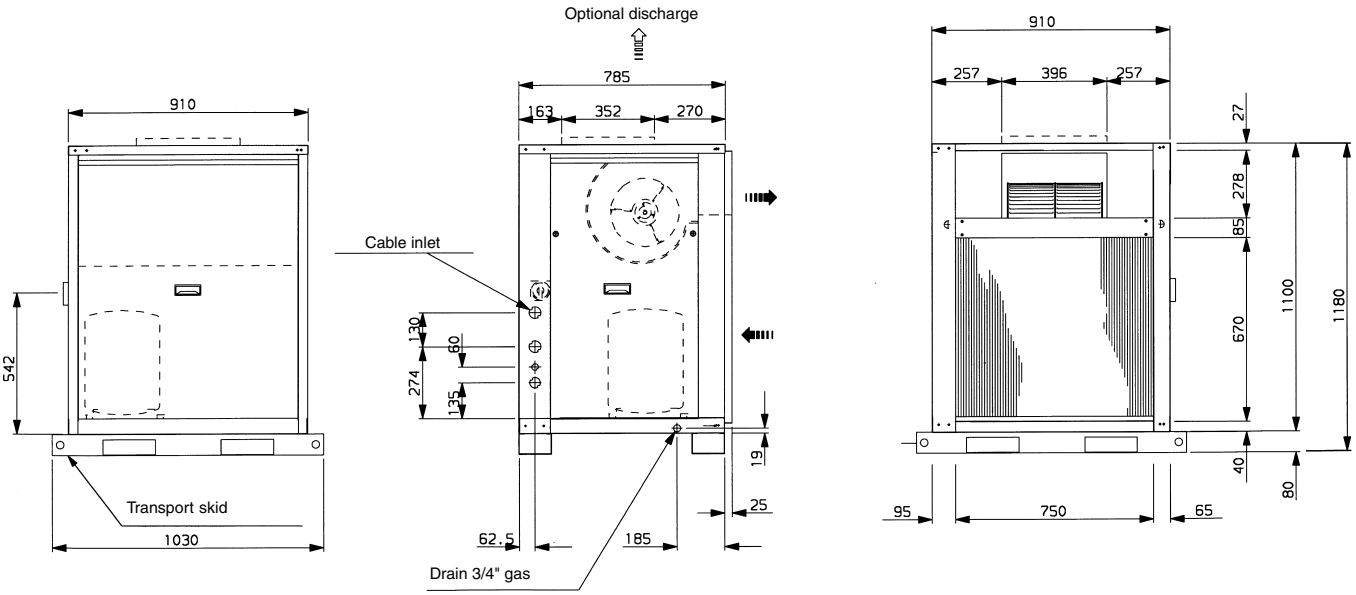
Effective power input in accordance with EUROVENT.

Fig. 1 - Dimensions, mm

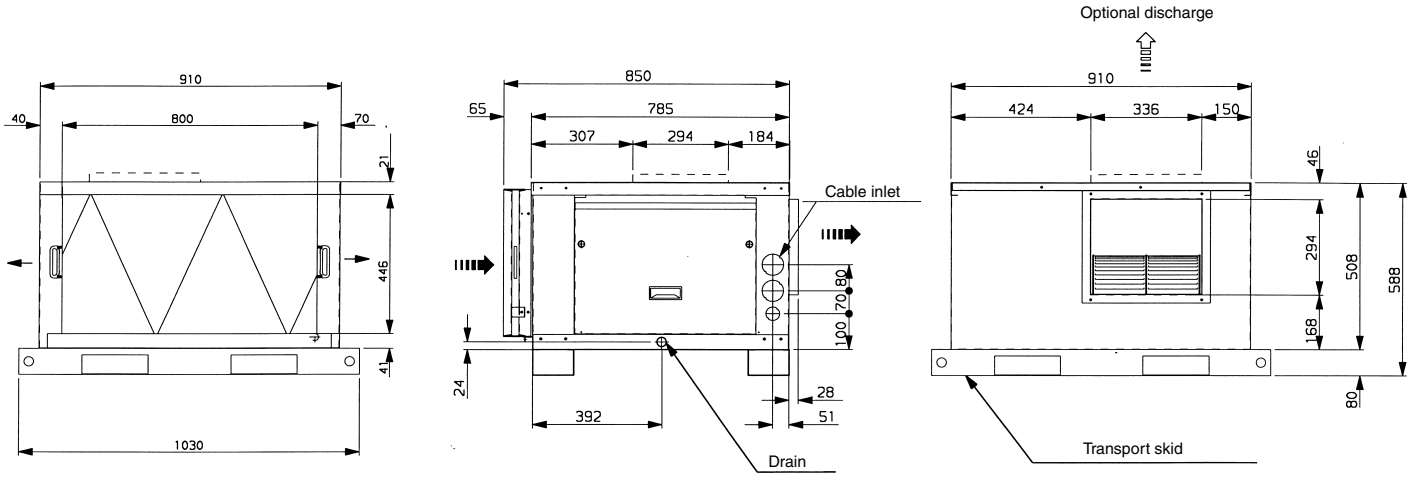
50VZ/PZ 015



38VZ/PZ 015



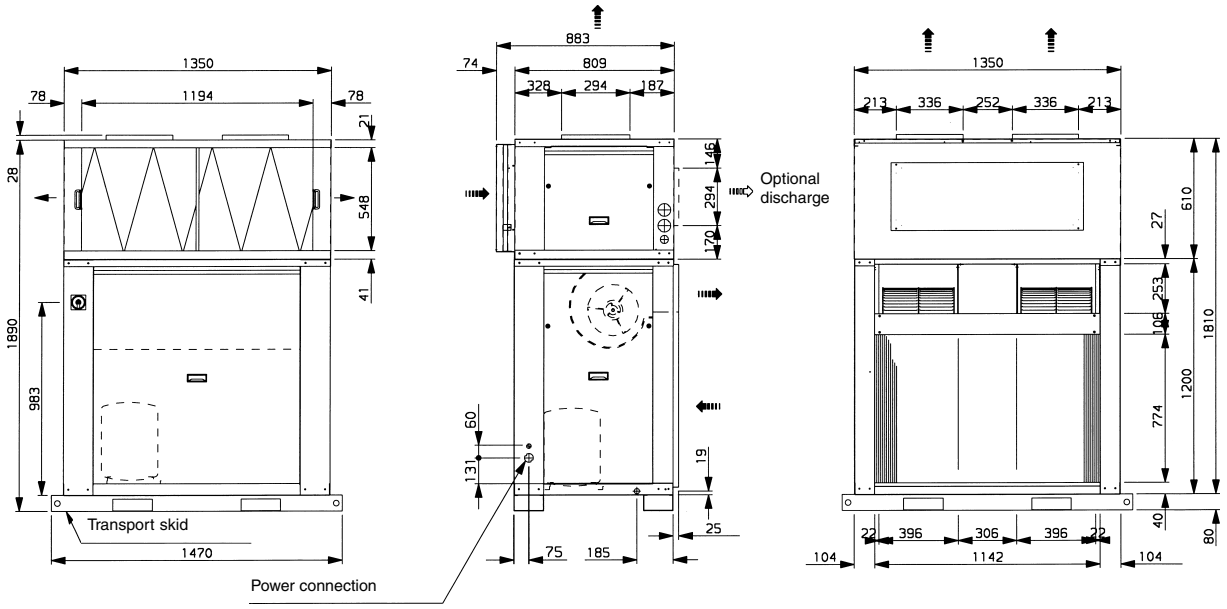
40PZ 015



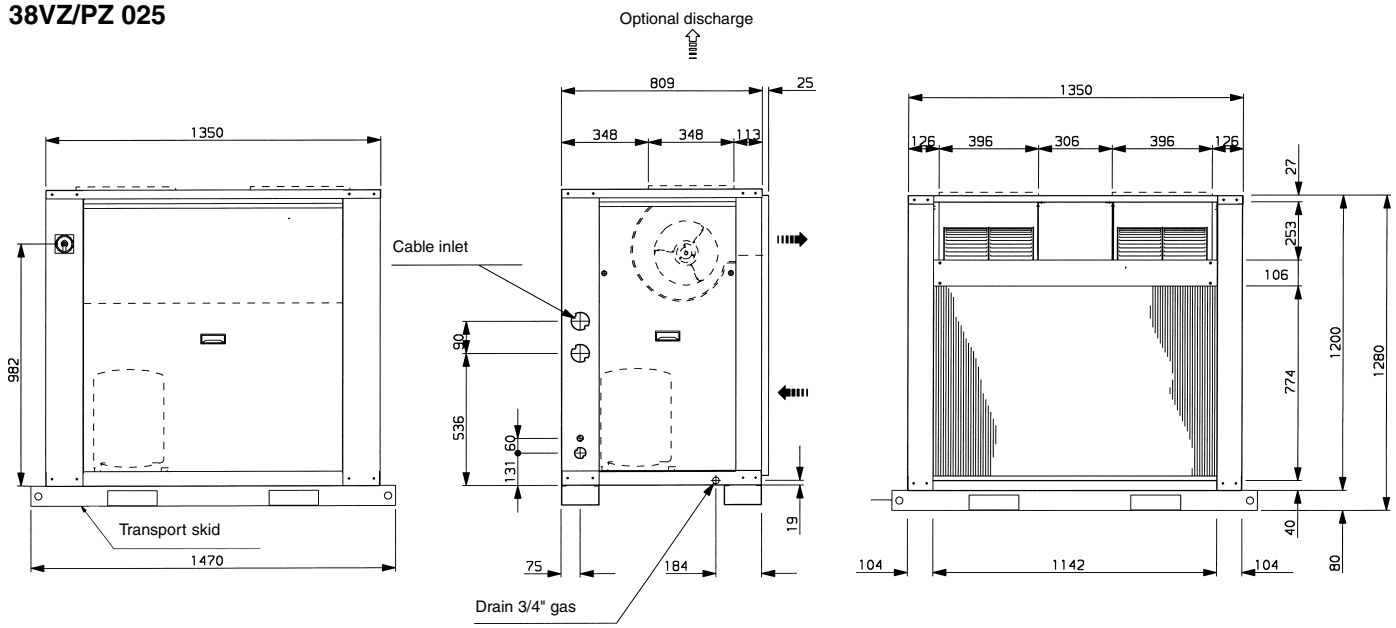
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 2 - Dimensions, mm

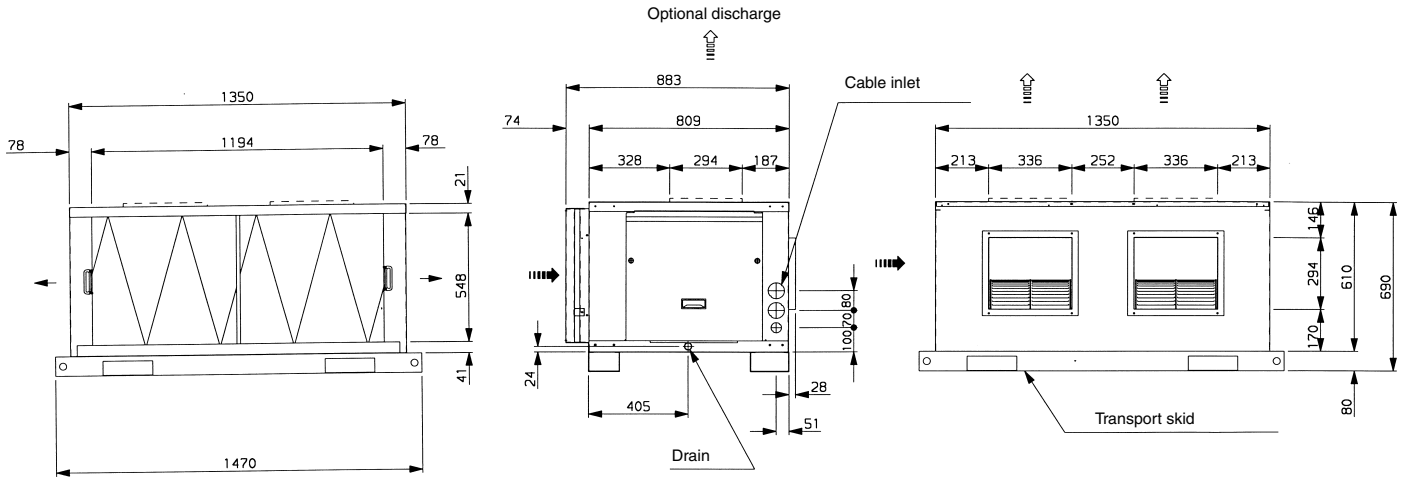
50VZ/PZ 025



38VZ/PZ 025



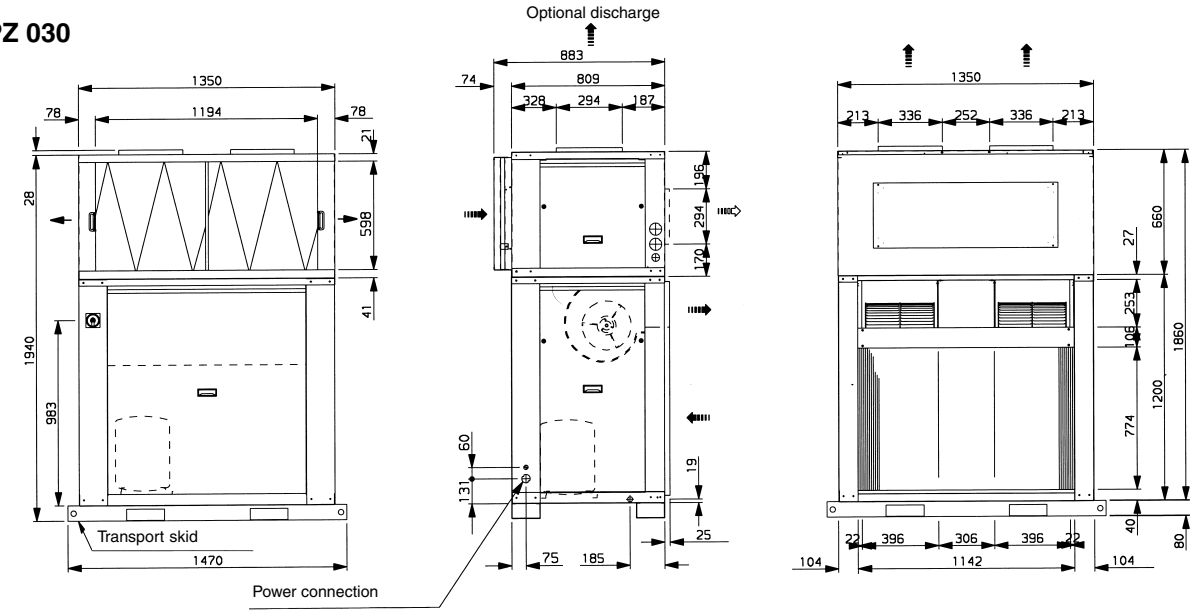
40PZ 025



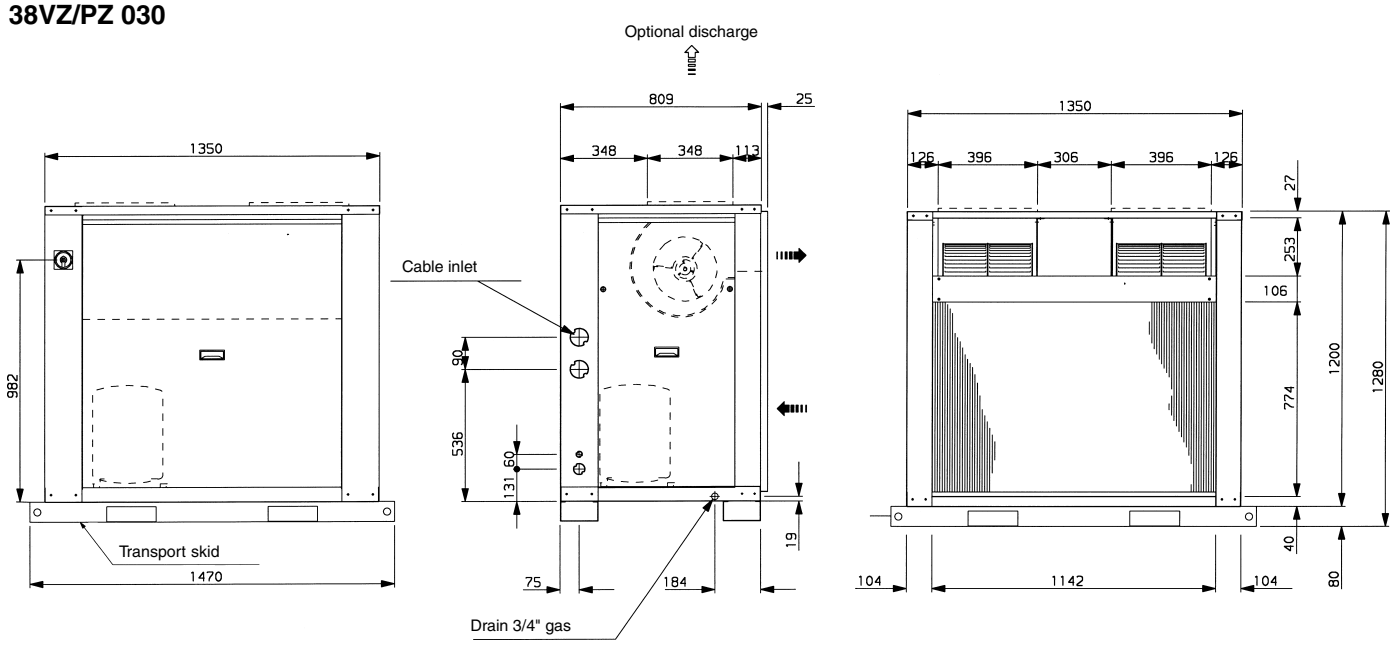
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 3 - Dimensions, mm

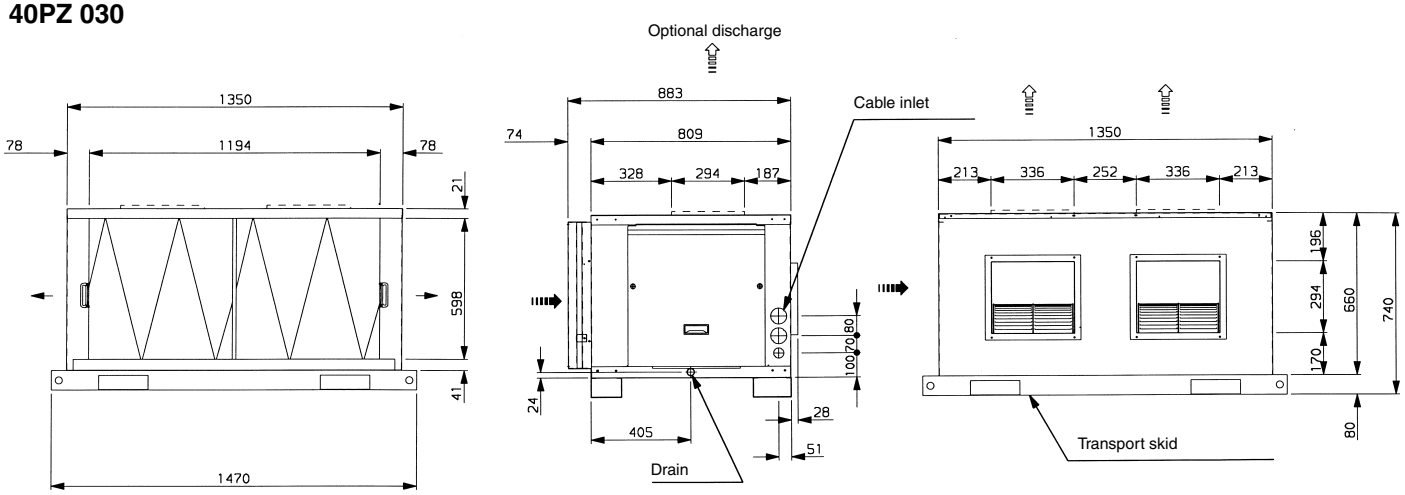
50VZ/PZ 030



38VZ/PZ 030



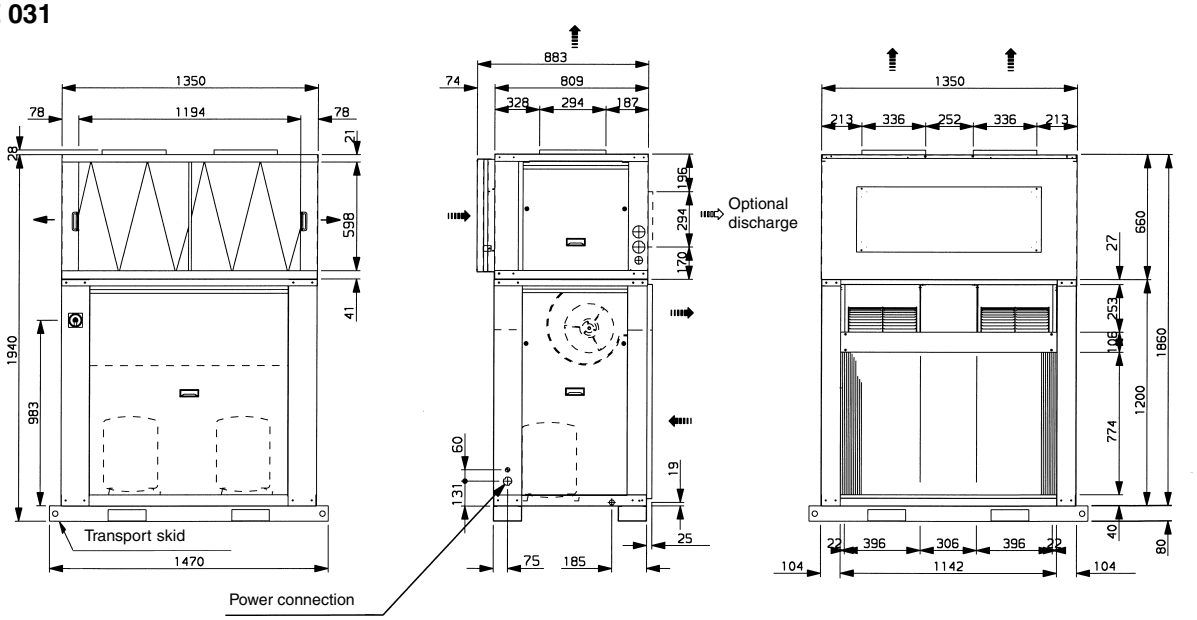
40PZ 030



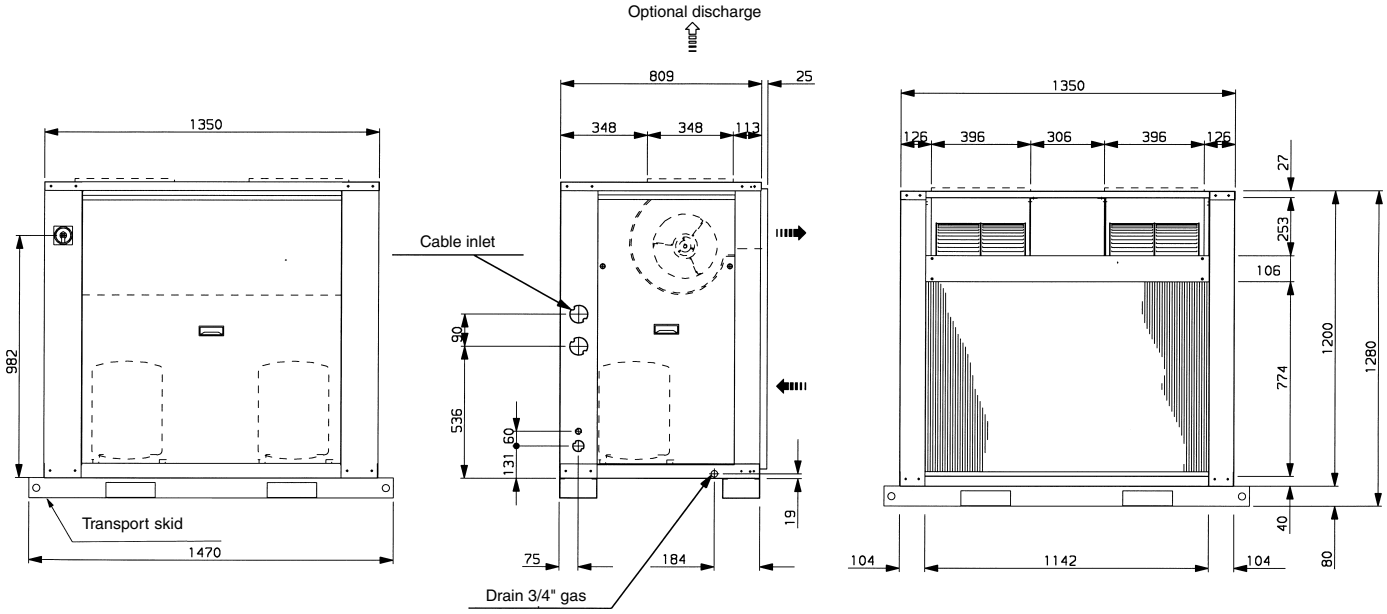
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 4 - Dimensions, mm

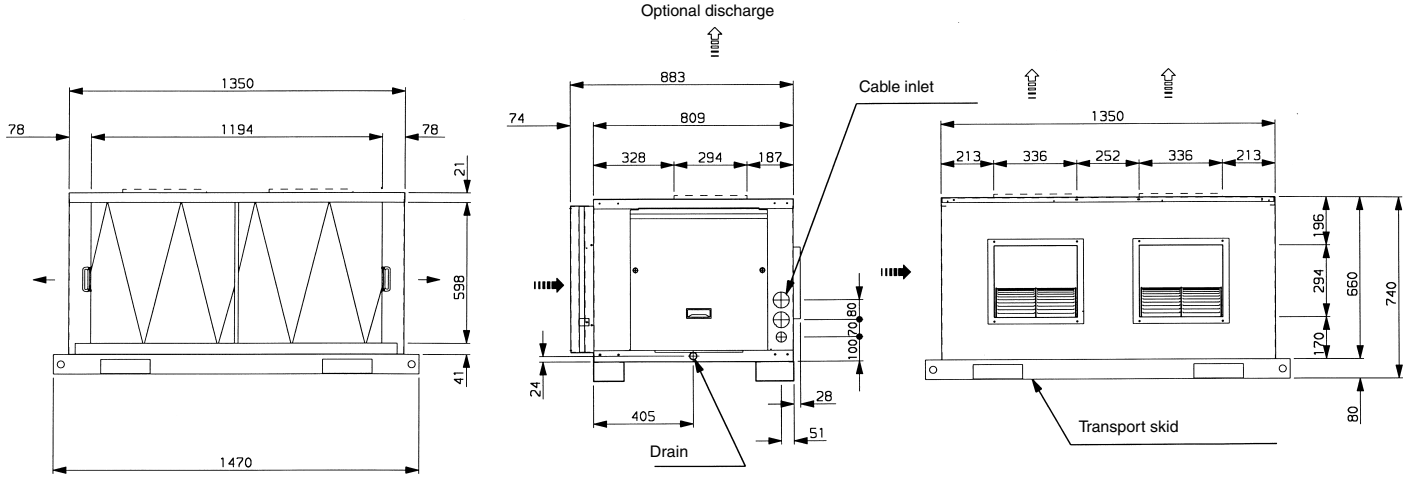
50VZ/PZ 031



38VZ/PZ 031



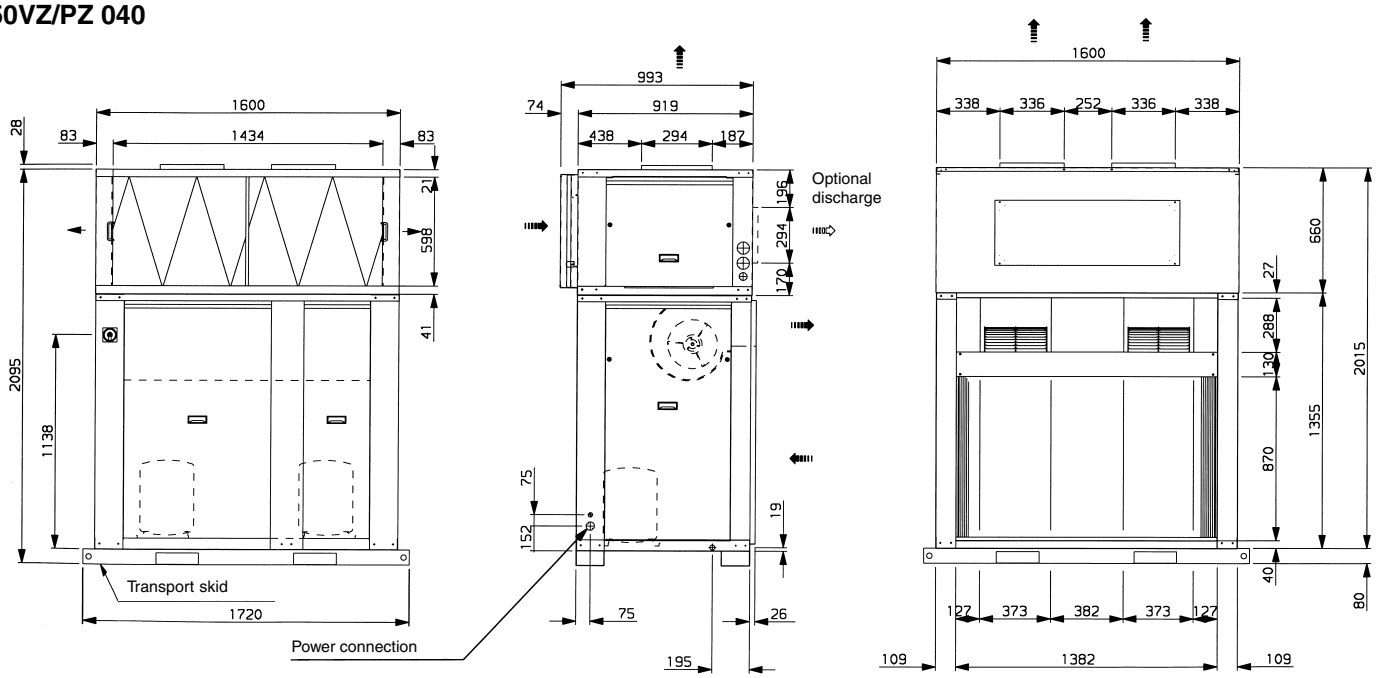
40PZ 031



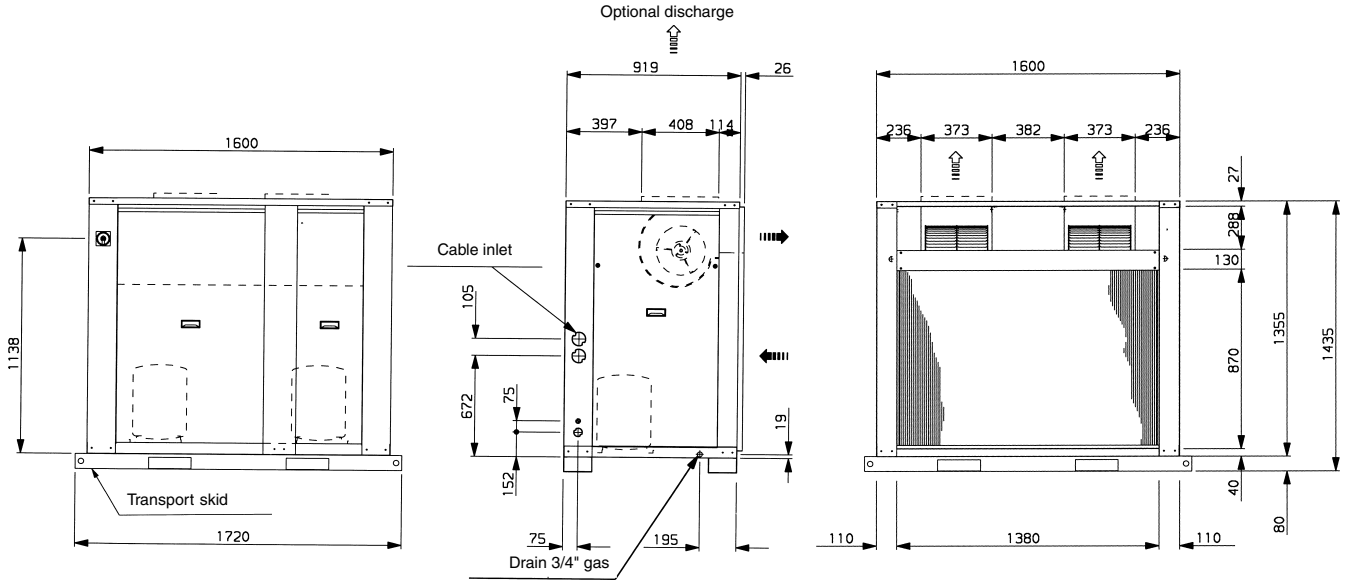
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 5 - Dimensions, mm

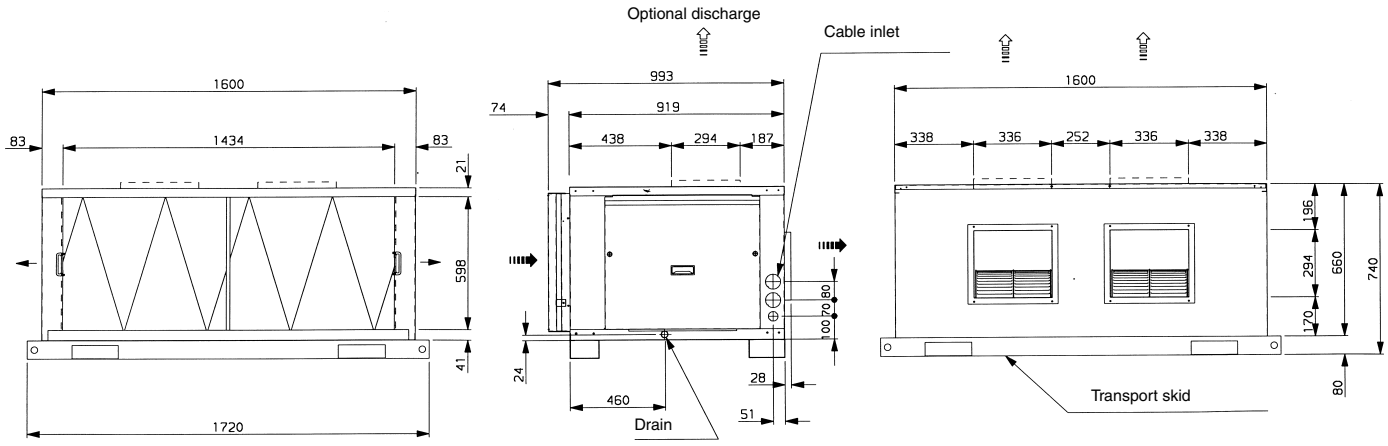
50VZ/PZ 040



38VZ/PZ 040



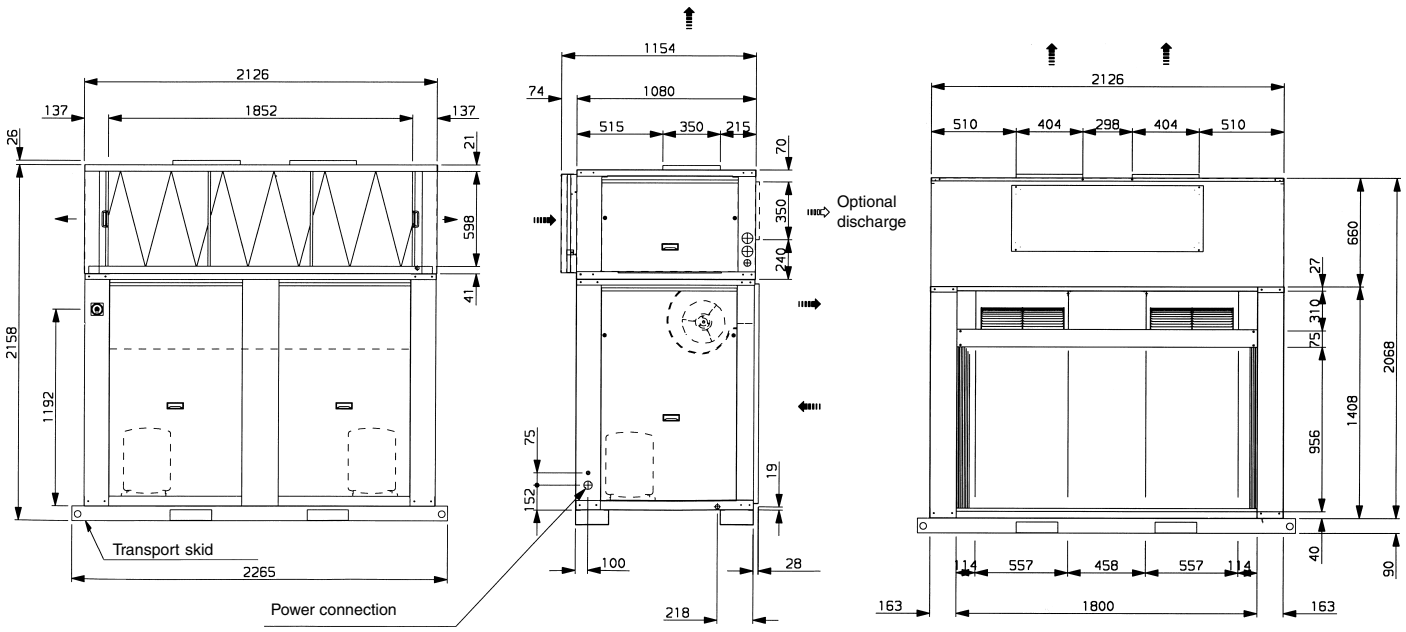
40PZ 040



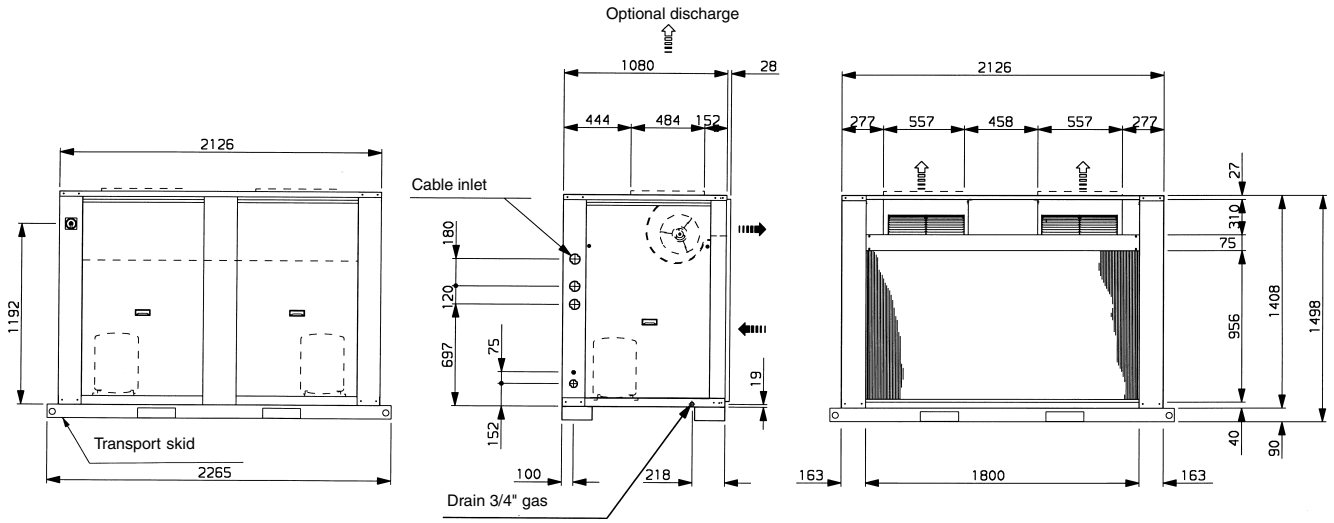
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 6 - Dimensions, mm

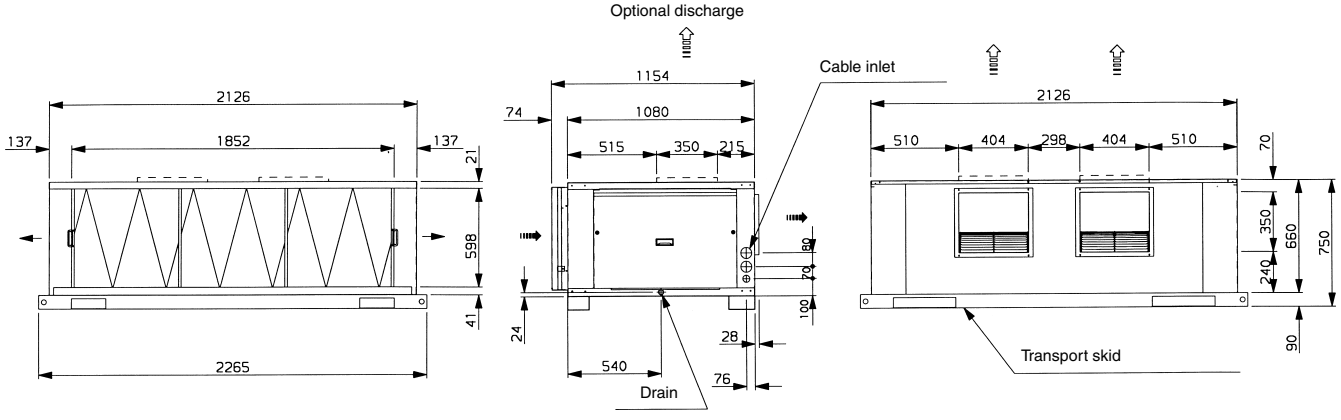
50VZ/PZ 045-055



38VZ/PZ 045-055



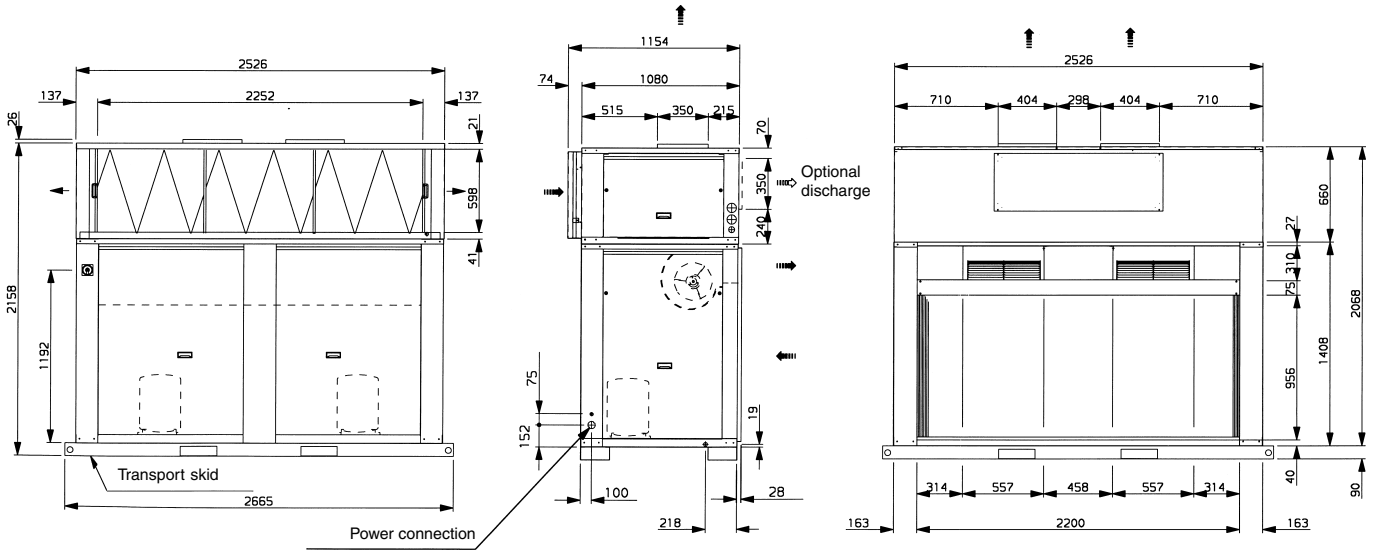
40PZ 045-055



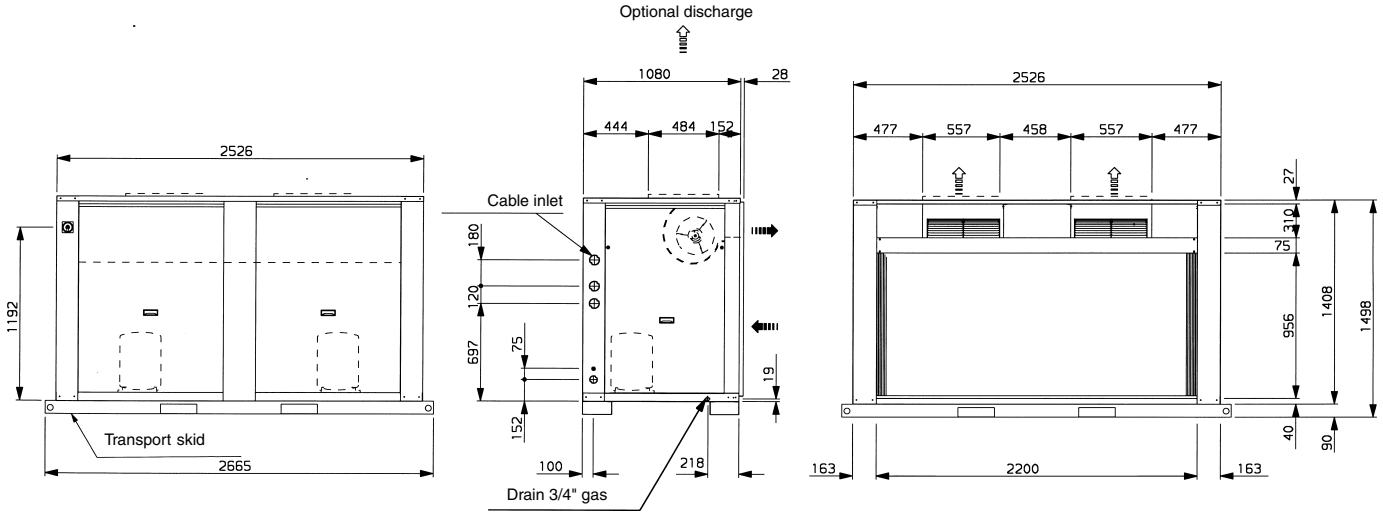
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 7 - Dimensions, mm

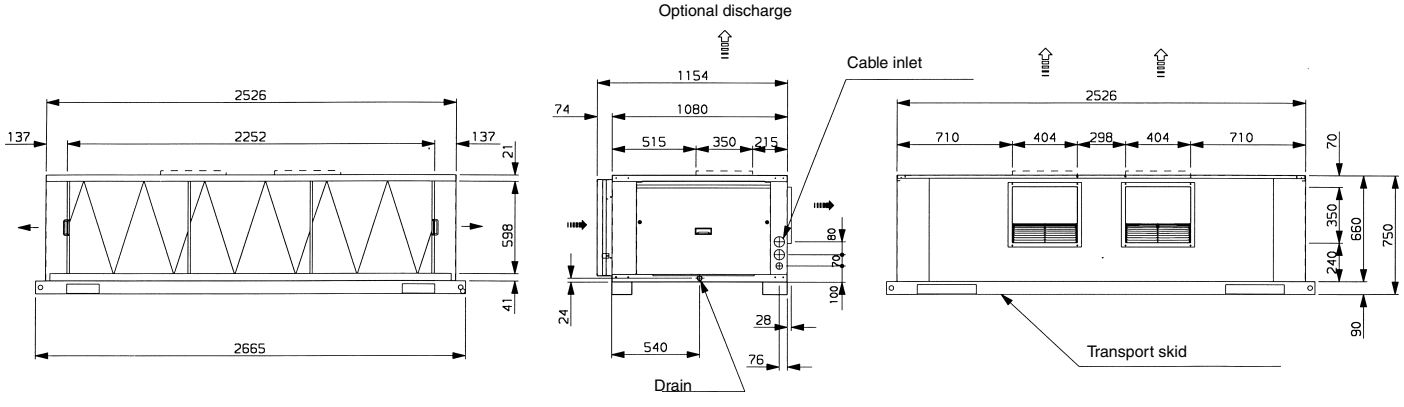
50VZ/PZ 065-075



38VZ/PZ 065-075



40PZ 065-075



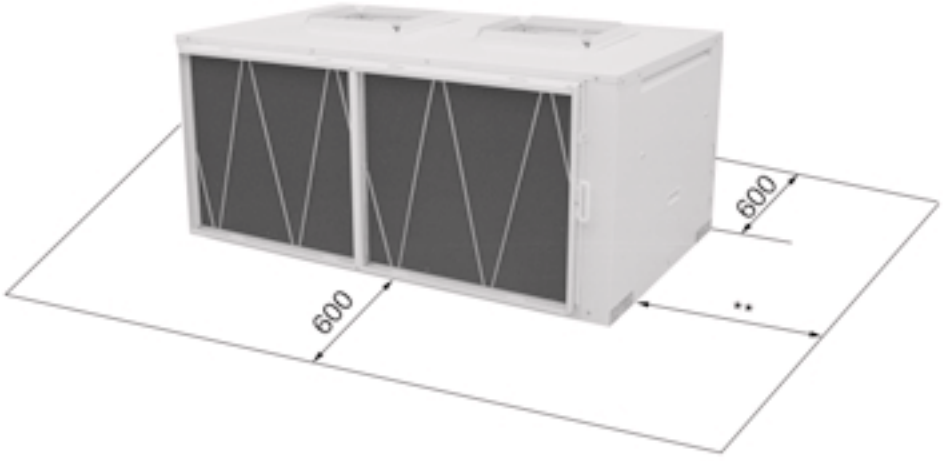
When designing an installation, always use up-to-date drawings, available from your local Carrier office

Fig. 8 - Service area, mm

50VZ/PZ

38VZ/PZ

40PZ



* Service space behind the unit depends on whether or not the unit is installed with outdoor air ducts. It is also necessary to leave space for cleaning and inspection of the outdoor heat exchanger.

** Space for removal of the air filter and the indoor or outdoor section belt and pulley transmission is required on the right and left hand side.

Fig. 9 - Centre of gravity, mm (approx.)

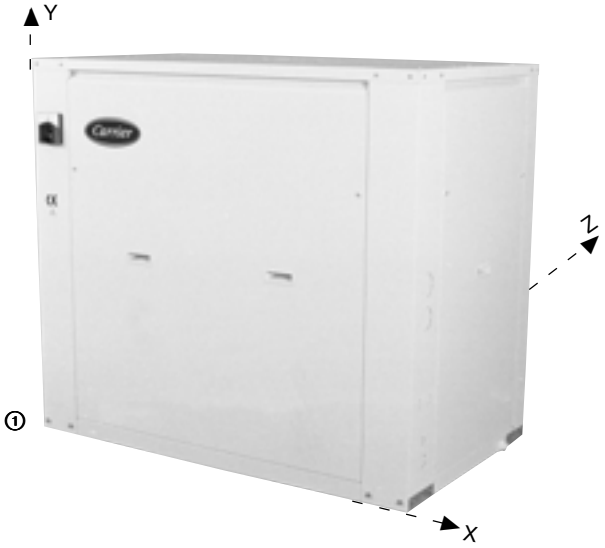
50VZ/PZ (all sizes)

50VZ/PZ	015	025	030	031	040	045	055	065	075
XG	381	627	639	723	858	1116	1122	1324	1359
YG	583	772	758	743	703	755	773	767	781
ZG	526	434	448	444	450	525	527	521	527

Measured from point

Fig. 10 - Centre of gravity, mm (approx.)

38VZ/PZ (all sizes)

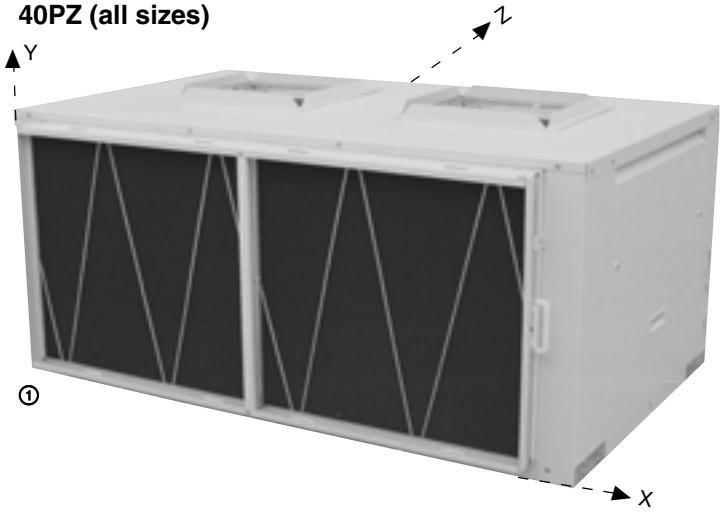


38VZ/PZ	015	025	030	031	040	045	055	065	075
XG	349	583	595	707	831	1081	1085	1289	1313
YG	382	552	518	509	498	512	509	495	489
ZG	586	479	493	485	463	542	556	566	577

Measured from point

Fig. 11 - Centre of gravity, mm (approx.)

40PZ (all sizes)

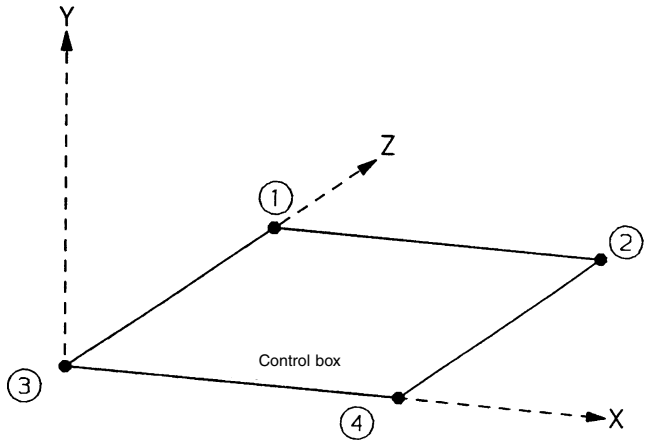


40PZ	015	025	030	031	040	045	055	065	075
XG	499	771	776	776	982	1261	1257	1453	1510
YG	230	296	314	314	308	341	338	337	333
ZG	301	286	307	307	389	452	417	360	364

Measured from point

Fig. 12 - Weight distribution, kg (approx.)

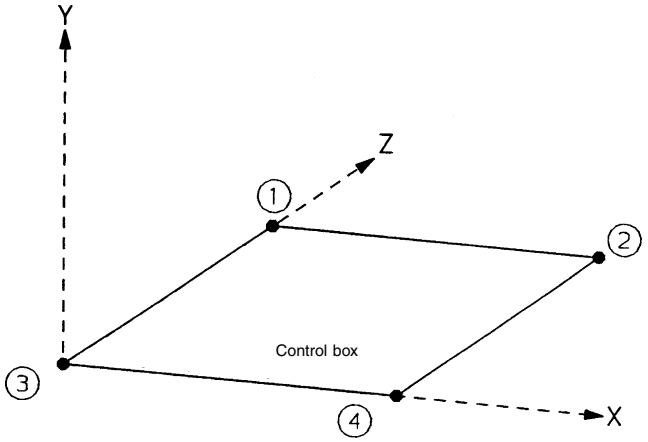
50VZ/PZ (all sizes)



Support	50VZ								
points	015	025	030	031	040	045	055	065	075
	45	70	68	106	164	178	190	215	235
	81	106	127	125	178	267	281	276	302
	37	84	72	82	132	158	171	198	217
	67	130	135	97	144	239	252	254	279
Support	**50PZ**								
points	**015**	**025**	**030**	**031**	**040**	**045**	**055**	**065**	**075**
	47	72	70	110	169	184	196	221	241
	83	109	130	129	183	272	287	282	308
	39	86	74	87	137	164	178	205	224
	69	133	138	101	149	244	258	260	285

Fig. 13 - Weight distribution, kg (approx.)

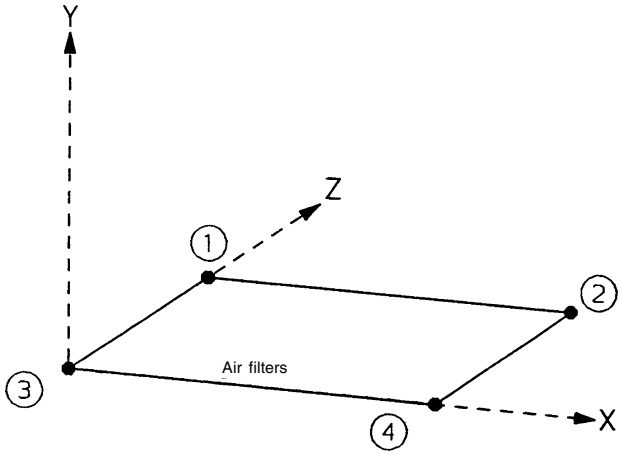
38VZ/PZ (all sizes)



Support	38VZ								
points	015	025	030	031	040	045	055	065	075
	38	62	63	66	115	131	134	151	166
	49	82	80	81	128	146	151	164	180
	35	58	59	60	83	136	154	152	167
	30	48	50	53	62	132	138	141	155
Support	**38PZ**								
points	**015**	**025**	**030**	**031**	**040**	**045**	**055**	**065**	**075**
	40	64	65	70	120	136	141	157	172
	51	84	82	85	133	151	157	170	186
	37	61	62	64	88	142	160	158	173
	32	51	53	58	67	138	144	148	162

Fig. 14 - Weight distribution, kg (approx.)

40PZ (all sizes)



Support	40PZ								
points	015	025	030	031	040	045	055	065	075
	14	32	35	35	54	45	50	56	64
	27	34	36	36	55	48	54	55	63
	14	36	39	39	59	103	107	113	120
	23	38	40	40	62	101	106	111	118

Indoor air discharge (50VZ/PZ)

The 50VZ/PZ units leave the factory with the indoor unit air discharge set to vertical, as indicated in the dimensional figures. It can be changed to horizontal discharge by following the steps below:

Change from vertical to horizontal discharge without changing the position of the motor

a. Detach the side access panels .
b. Remove the drive belt(s) (only sizes 50VZ/PZ 015, 045, 055, 065, 075).
c. Detach rear blanking plate and fan supply air ducts .
d. Detach the fans from the reinforcement flanges of the upper panel and from the U-bracket .
e. Detach the U-bracket from the angle iron attached to the base . Remove the U-bracket .
f. Install the fans, attaching them to the reinforcement flanges of the rear panel and base support .
g. Install strengthening support , attaching it between the fan and the roof (only sizes 50VZ/PZ 045-055-065-075).
h. Install blanking plate in the upper panel and fan supply air ducts in the unit rear panel.
i. Replace the drive belt(s) and ensure that the tension and alignment are correct (only sizes 50VZ/PZ 015, 045, 055, 065, 075).
j. Replace the access panels .

See figures 15 and 16.

Change from vertical to horizontal discharge with changing the position of the motor

a. Detach the side access panels .
b. Remove the drive belt(s) .
c. Detach rear blanking plate and fan supply air ducts .
d. Detach the fans from the reinforcement flanges of the upper panel and from the U-bracket .
e. Detach the U-bracket from the angle iron attached to the base . Remove the U-bracket .
f. For units 50VZ/PZ 025, 030, 031 and 040 change the motor to the other fan.
g. For units 50VZ/PZ 045, 055, 065 and 075 detach the drive base together with the motor and reposition it on the opposite side.
h. Remove the fan pulley and reposition it on the other side.
i. Install the fans, attaching them to the reinforcement flanges of the rear panel and base support .
j. Install strengthening support , attaching it between the fan and the roof (only sizes 50VZ/PZ 045-055-065-075).
k. Install blanking plate in the upper panel and fan supply air ducts in the unit rear panel.
l. Replace the drive belt(s) and ensure that the tension and alignment are correct.
m. Replace the access panels .

See figures 15 and 16.

Indoor air discharge (40PZ)

The 40PZ units leave the factory with the air discharge set to horizontal, as indicated in the dimensional figures. It can be changed to vertical discharge by following the steps below:

Change from horizontal to vertical discharge without changing the position of the motor

a. Detach the side access panels .
b. Remove the drive belt(s) (only sizes 40PZ 015, 045, 055, 065, 075).
c. Detach top blanking plate and fan supply air ducts .
d. Detach strengthening support between the fan and the roof (only sizes 40PZ 045-055-065-075). Discard the support.
e. Detach the fans from the reinforcement flanges of the rear panel and from base support .
f. Install U-bracket , included with the unit, by attaching it to base support .
g. Install the fans, attaching them to the reinforcement flanges of the upper panel and to U-bracket .
h. Install blanking plate in the rear panel and fan supply air ducts in the upper unit panel.
i. Replace the drive belt(s) and ensure that the tension and alignment are correct (only units 40PZ 015, 045, 055, 065, 075).
j. Replace the access panels .

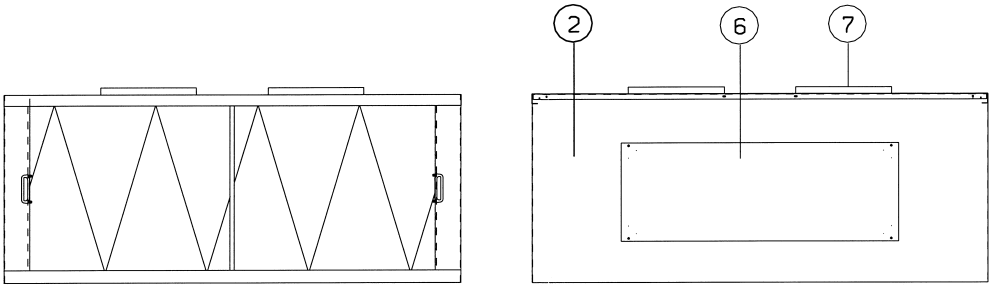
See figures 15 and 16.

Change from horizontal to vertical discharge with changing the position of the motor

a. Detach the side access panels .
b. Remove the drive belt(s) .
c. Detach top blanking plate and fan supply air ducts .
d. Detach strengthening support between the fan and the roof (only sizes 40PZ 045-055-065-075). Discard the support.
e. Detach the fans from the reinforcement flanges of the rear panel and from base support .
f. Install U-bracket , included with the unit, by attaching it to base support .
g. For units 40PZ 025, 030, 031, 040 change the motor to the other fan.
h. For units 40PZ 045, 055, 065, 075 detach the drive base together with the motor and reposition it on the opposite side.
i. Remove the fan pulley and reposition it on the other side.
j. Install the fans, attaching them to the reinforcement flanges of the upper panel and to U-bracket .
k. Install blanking plate in the rear panel and fan supply air ducts in the upper unit panel.
l. Replace the drive belt(s) and ensure that the tension and alignment are correct.
m. Replace the access panels .

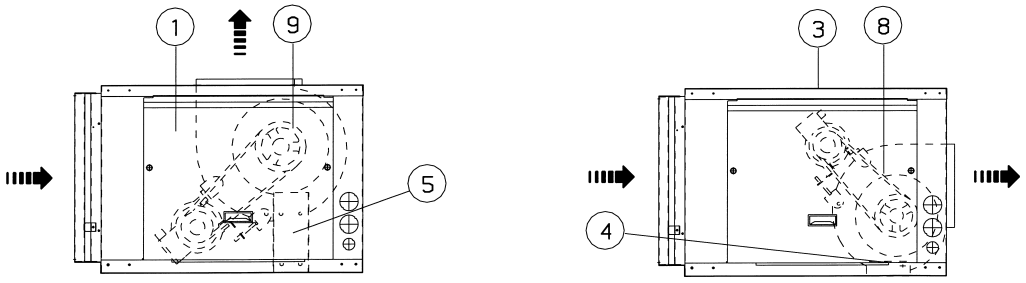
See figures 15 and 16.

Fig. 15 - Repositioning unit air discharge (50VZ/PZ 025, 030, 031, 040 40PZ 025, 030, 031, 040)



Front view

Rear view



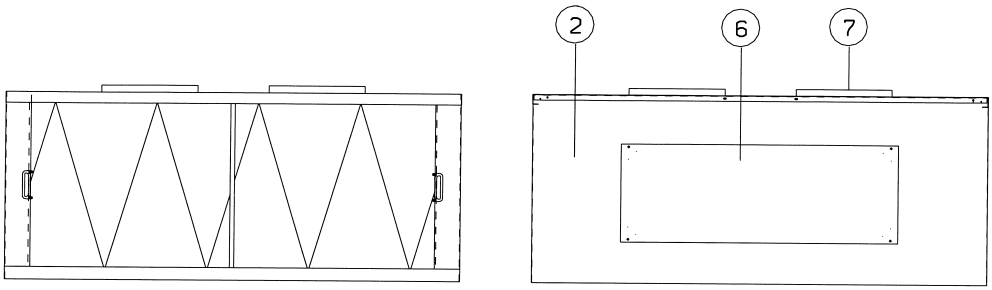
Side view (vertical discharge)

Side view (horizontal discharge)

Legend

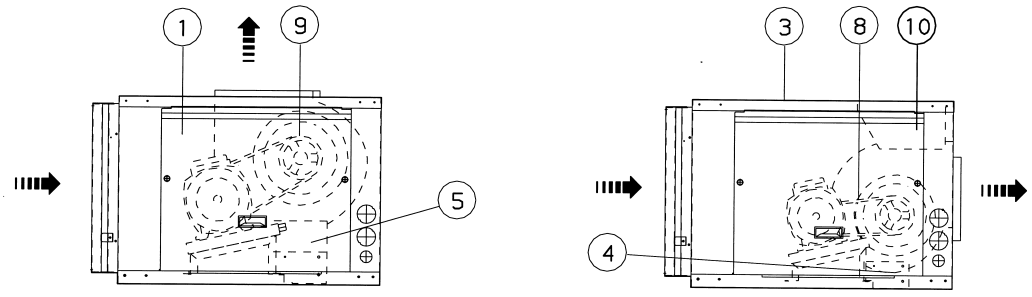
Side access panel
Rear discharge panel
Top panel
Angle iron attached to the base
U-bracket
Blanking plate
Fan supply air ducts
Drive belt(s)
Fan pulley

Fig. 16 - Repositioning unit air discharge (50VZ/PZ 015, 045, 055, 065, 075 40PZ 015, 045, 055, 065, 075)



Front view

Rear view



Side view (vertical discharge)

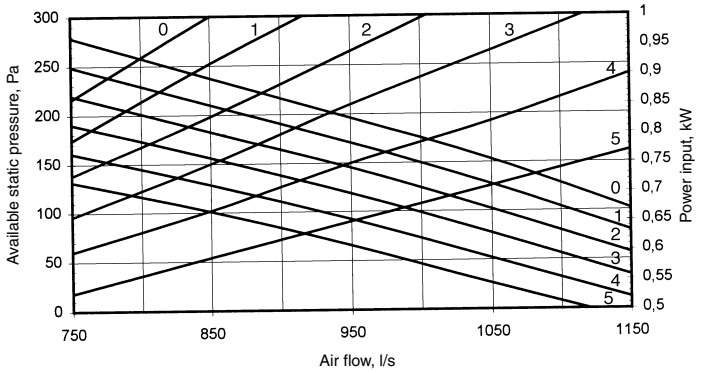
Side view (horizontal discharge)

Legend

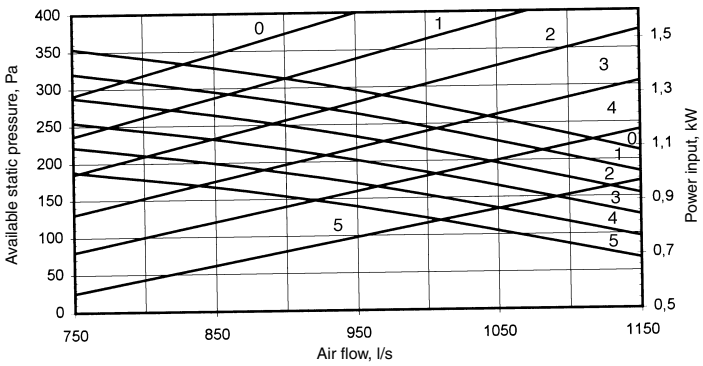
Side access panel
Rear discharge panel
Top panel
Angle iron attached to the base
U-bracket
Blanking plate
Fan supply air ducts
Drive belt(s)
Fan pulley
Strengthening support

Fan performance

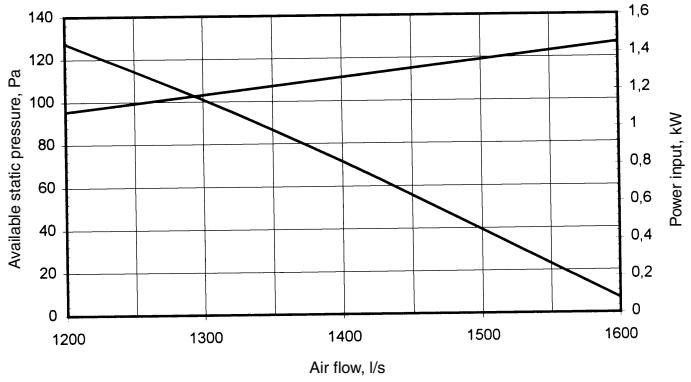
50VZ/PZ 015 indoor fan (40PZ 015) standard transmission



50VZ/PZ 015 indoor fan (40PZ 015) optional larger transmission



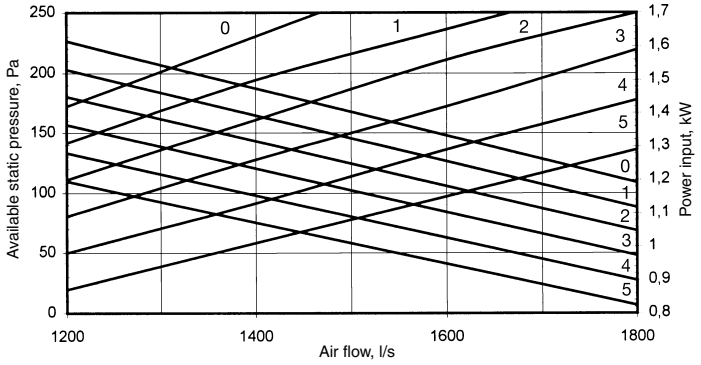
50VZ/PZ 015 outdoor fan (38VZ/PZ 015) standard transmission



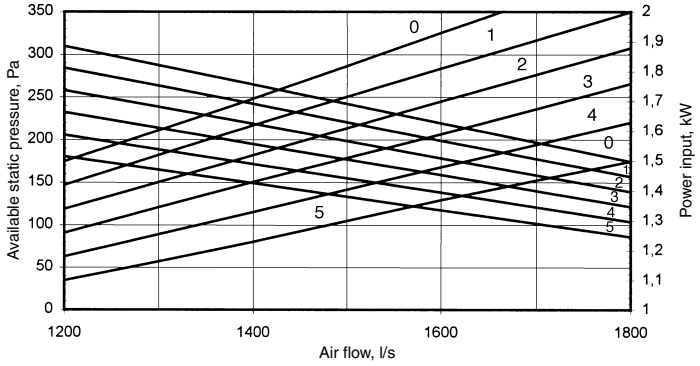
Curve	Pulley open	Indoor fan		Outdoor fan	
		Standard r/s	Superior r/s	Standard r/s	Superior r/s
0	Closed	19.6	23.08		
1	1	18.75	22.18		
2	2	18.33	21.28		
3	3	17.67	20.38		
4	4	17	19.5		
5	5	16.33	18.6		
Factory	3.5	17.33		15.25	

Fan performance

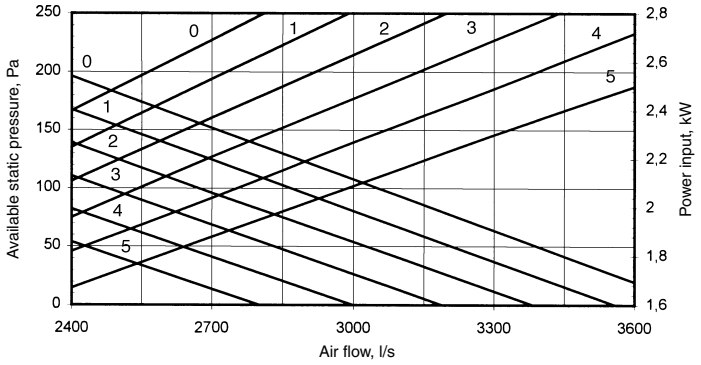
50VZ/PZ 025 indoor fan (40PZ 025) standard transmission



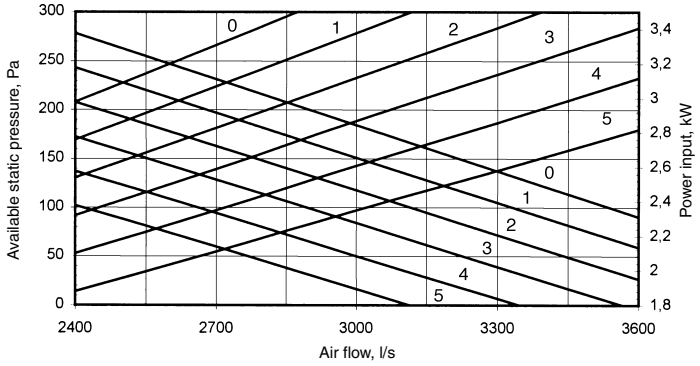
50VZ/PZ 025 indoor fan (40PZ 025) optional larger transmission



50VZ/PZ 025 outdoor fan (38VZ/PZ 025) standard transmission



50VZ/PZ 025 outdoor fan (38PV/PZ 025) optional larger transmission

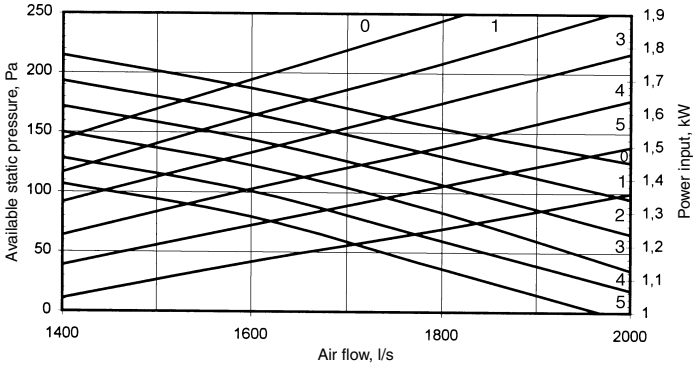


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	19.8	20.5	17.42	19.33
1	1	18.33	19.83	16.66	18.46
2	2	17.58	19.16	15.92	17.6
3	3	16.83	18.5	15.16	16.73
4	4	16.08	17.83	14.42	15.86
5	5	15.33	17.16	13.66	15
Factory	3.5/2*	16.45		15.92	

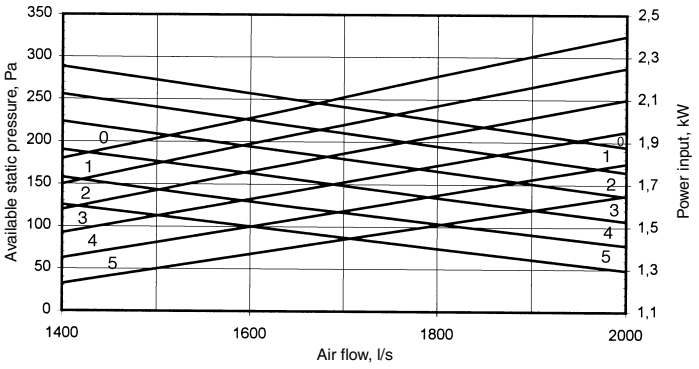
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

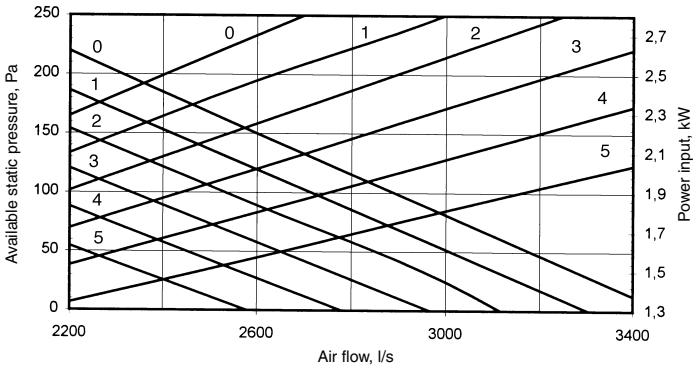
50VZ/PZ 030/031 indoor fan (40PZ 030/031) standard transmission



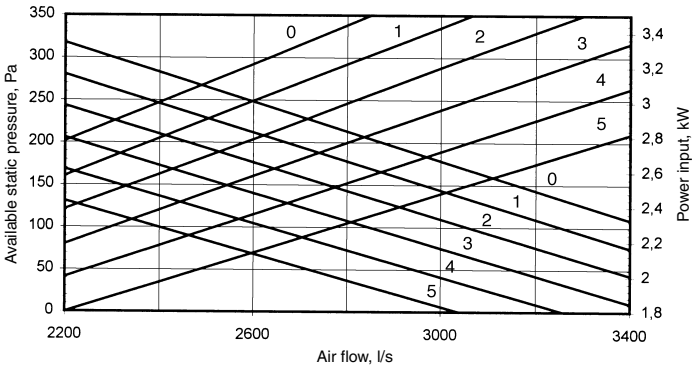
50VZ/PZ 030/031 indoor fan (40PZ 030/031) optional larger transmission



50VZ/PZ 030/031 outdoor fan (38VZ/PZ 030/031) standard transmission



50VZ/PZ 030/031 outdoor fan (38PV/PZ 030/031) optional larger transmission

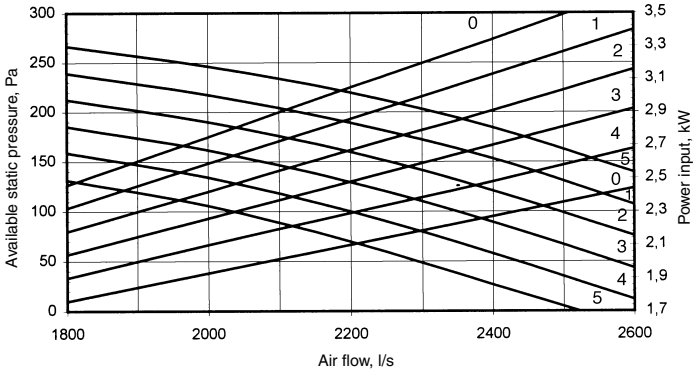


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	19.33	21.76	18.2	20.5
1	1	18.5	20.76	17.36	19.58
2	2	17.66	19.76	16.53	18.66
3	3	16.92	18.76	15.7	17.75
4	4	15.83	17.76	14.86	16.83
5	5	14.92	16.76	14.03	15.92
Factory	2.5/2*	17.29		16.53	

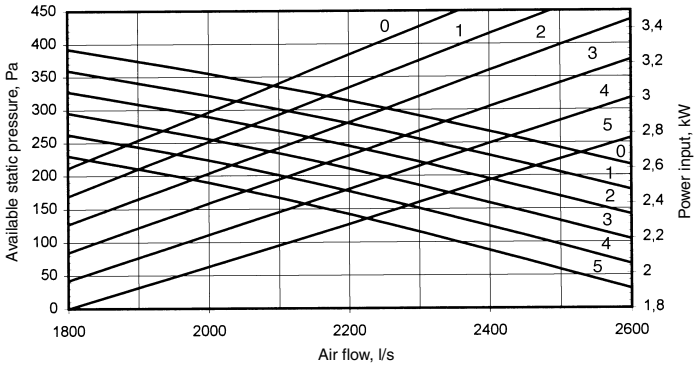
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

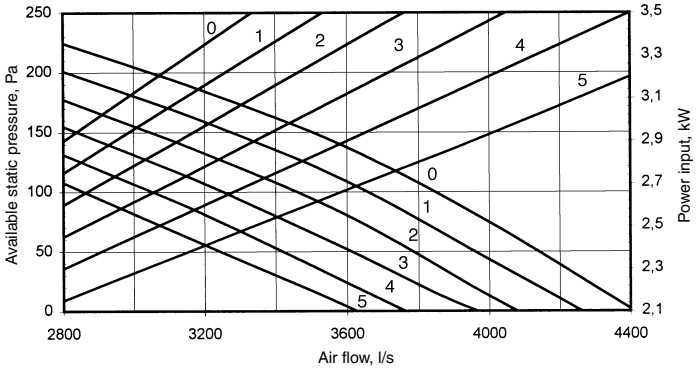
50VZ/PZ 040 indoor fan (40PZ 040) standard transmission



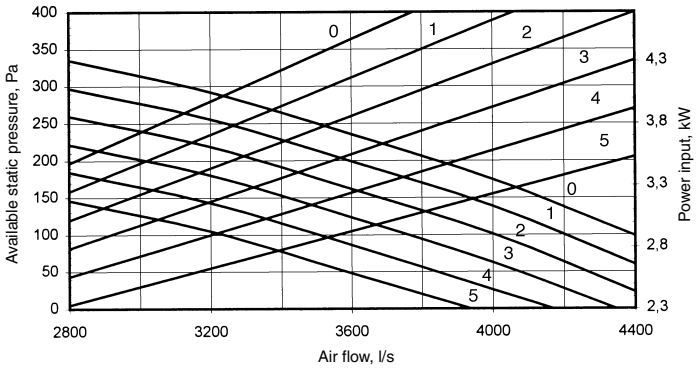
50VZ/PZ 040 indoor fan (40PZ 040) optional larger transmission



50VZ/PZ 040 outdoor fan (38VZ/PZ 040) standard transmission



50VZ/PZ 040 outdoor fan (38PV/PZ 040) optional larger transmission

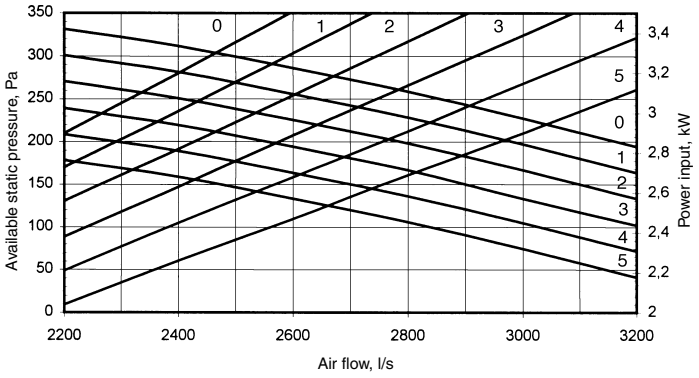


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	21.92	24.33	15	17
1	1	21.08	23.42	14.5	16.33
2	2	20.25	22.5	14	15.66
3	3	19.42	21.58	13.5	15
4	4	18.5	20.66	13	14.33
5	5	17.58	19.75	12.5	13.66
Factory	2.5/2.5*	19.84		13.75	

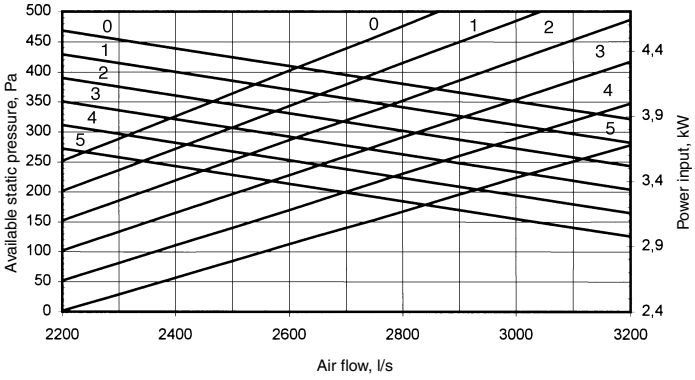
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

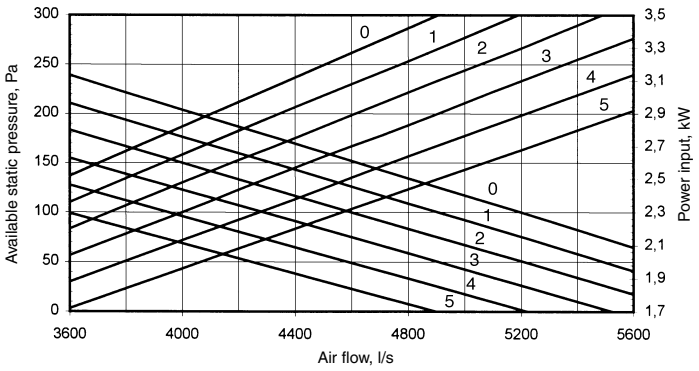
50VZ/PZ 045 indoor fan (40PZ 045) standard transmission



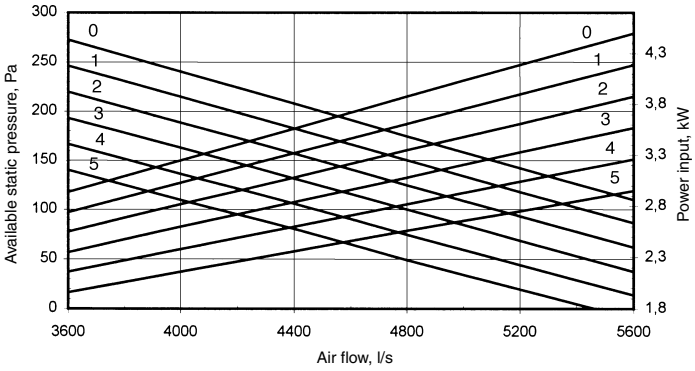
50VZ/PZ 045 indoor fan (40PZ 045) optional larger transmission



50VZ/PZ 045 outdoor fan (38VZ/PZ 045) standard transmission



50VZ/PZ 045 outdoor fan (38PV/PZ 045) optional larger transmission

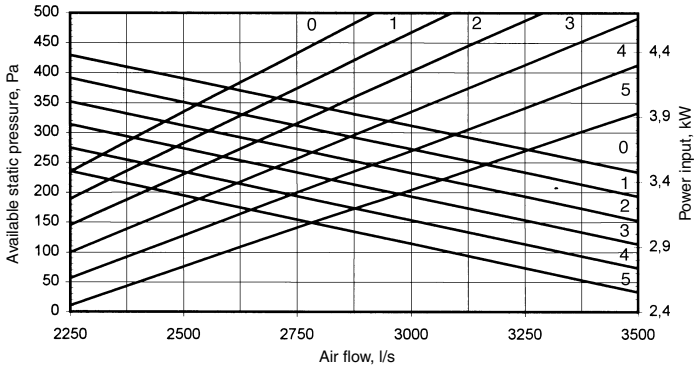


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	19.5	21.33	12.25	12.83
1	1	18.66	20.58	11.75	12.33
2	2	17.92	19.83	11.25	11.83
3	3	17.16	19.08	10.75	11.33
4	4	16.42	18.33	10.25	10.83
5	5	15.66	17.58	9.75	10.33
Factory	3/3*	17.16		10.75	

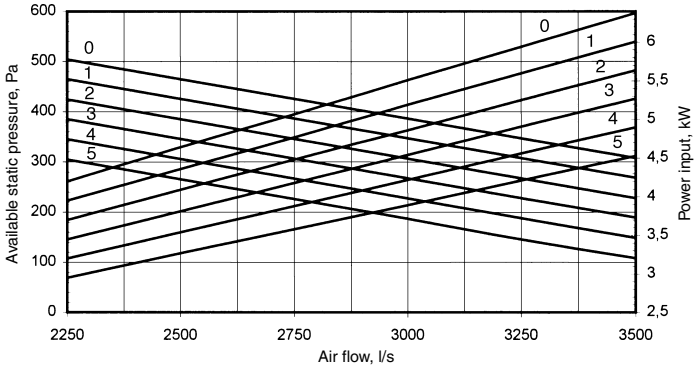
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

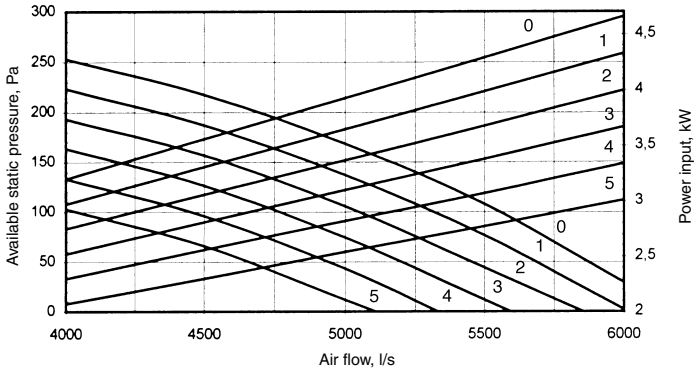
50VZ/PZ 055 indoor fan (40PZ 055) standard transmission



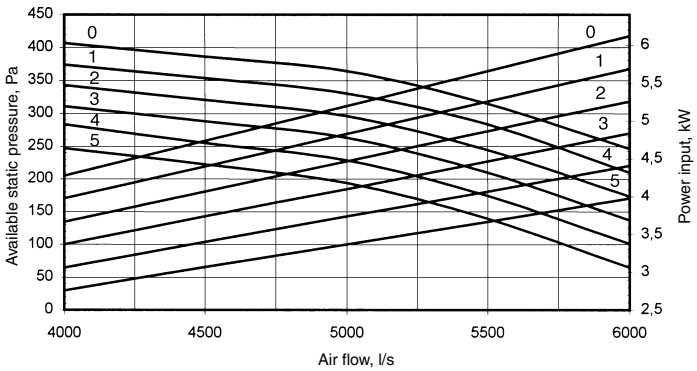
50VZ/PZ 055 indoor fan (40PZ 055) optional larger transmission



50VZ/PZ 055 outdoor fan (38VZ/PZ 055) standard transmission



50VZ/PZ 055 outdoor fan (38PV/PZ 055) optional larger transmission

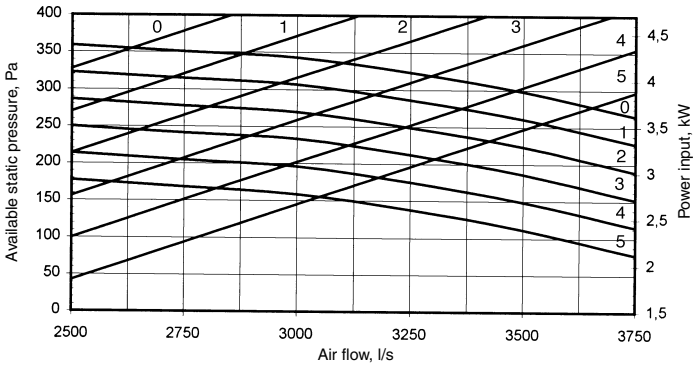


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	21.16	22.75	13	15
1	1	20.42	22	12.5	14.5
2	2	19.66	21.16	12	14
3	3	18.92	20.42	11.5	13.5
4	4	18.16	19.58	11	13
5	5	17.42	18.83	10.5	12.5
Factory	4/2*	18.16		12	

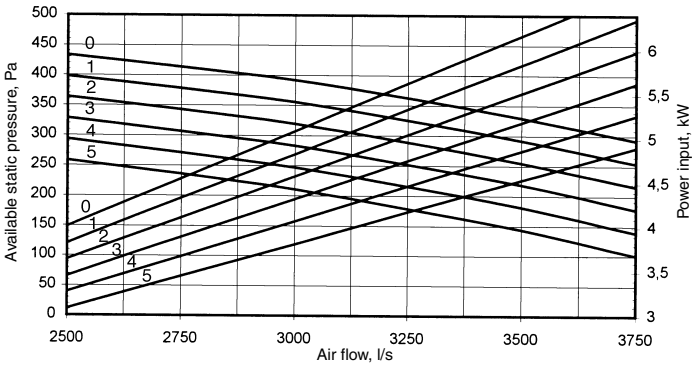
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

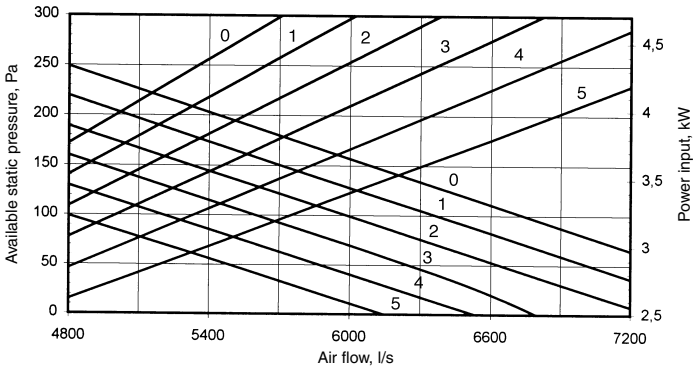
50VZ/PZ 065 indoor fan (40PZ 065) standard transmission



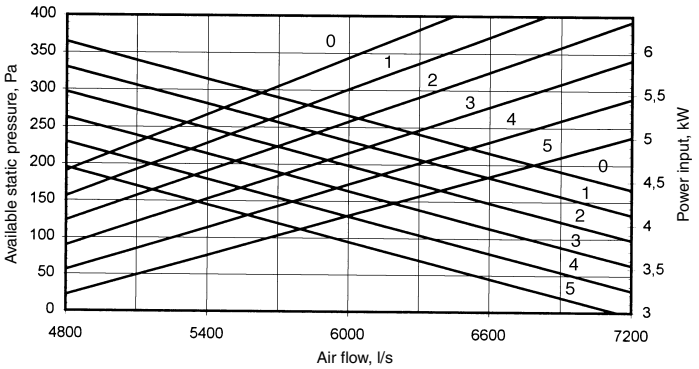
50VZ/PZ 065 indoor fan (40PZ 065) optional larger transmission



50VZ/PZ 065 outdoor fan (38VZ/PZ 065) standard transmission



50VZ/PZ 065 outdoor fan (38PV/PZ 065) optional larger transmission

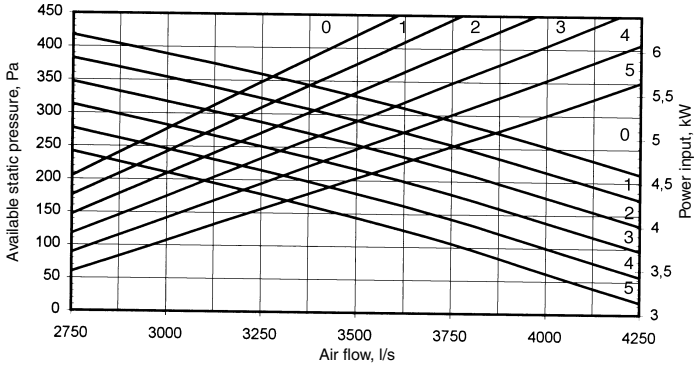


		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	21.5	22.66	12.75	14.33
1	1	20.66	21.9	12.25	13.83
2	2	19.83	21.13	11.75	13.33
3	3	19	20.36	11.25	12.73
4	4	18.16	19.6	10.83	12.33
5	5	17.33	18.83	10.42	11.83
Factory	3.5/2*	18.58		11.75	

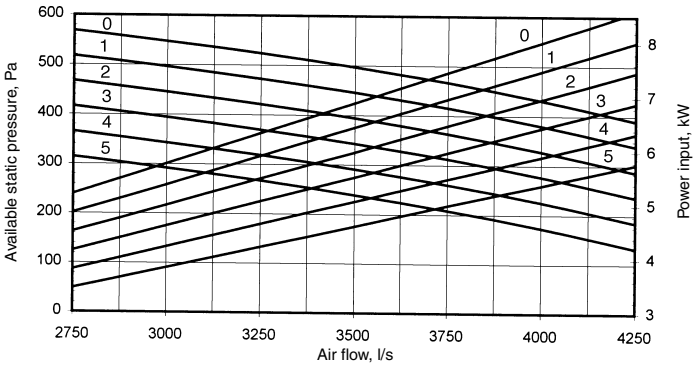
* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

Fan performance

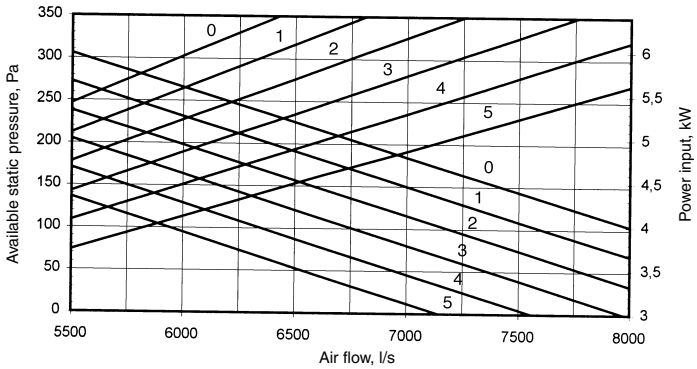
50VZ/PZ 075 indoor fan (40PZ 075) standard transmission



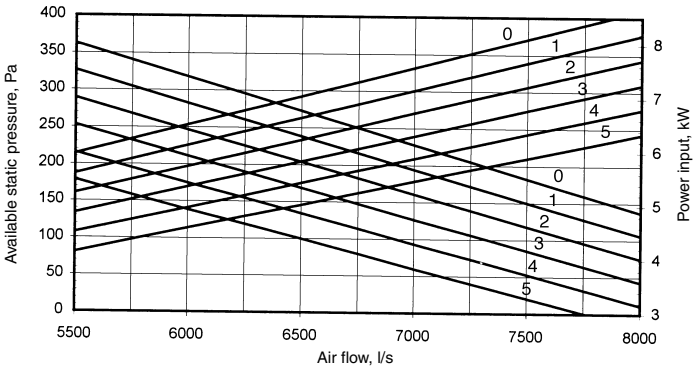
50VZ/PZ 075 indoor fan (40PZ 075) optional larger transmission



50VZ/PZ 075 outdoor fan (38VZ/PZ 075) standard transmission



50VZ/PZ 075 outdoor fan (38PV/PZ 075) optional larger transmission



		Indoor fan		Outdoor fan	
Curve	**Pulley open**	**Standard r/s**	**Superior r/s**	**Standard r/s**	**Superior r/s**
0	Closed	22.66	23.58	14.33	15
1	1	21.9	22.75	13.83	14.5
2	2	21.13	21.92	13.33	14
3	3	20.36	21.08	12.83	13.5
4	4	19.6	20.25	12.33	13
5	5	18.83	19.42	11.83	12.5
Factory	3/2.5*	20.36		13.08	

* The first value is for the indoor unit pulley; the second value is for the outdoor unit pulley

SAFETY CONSIDERATIONS

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components.

Only trained and qualified service personnel should install, start-up or service air conditioning equipment. Untrained personnel can perform the basic maintenance functions of cleaning and replacing filters.

All other operations should be performed by trained service personnel.

When working on air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for unbrazing operations.

WARNING: Before performing service or maintenance operations on the unit, turn off the main power switch to the unit. Electrical shock could cause personal injury.

All units are designed for ducted installation (indoor and/or outdoor air discharge). If ducts are not used the installer must place a protection grille in the discharge.

Only for use when repairing "Original Spare Parts". For repairs, special attention must be paid to the correct installation of the spare parts. The parts must always be installed in their original position.

During unit operation, some of the refrigerant circuit elements could reach a temperature in excess of 70°C so only trained or qualified personnel should access areas protected by access panels.

This unit should not be installed in an explosive atmosphere.

The unit can operate in normal radioelectric atmospheres in residential, commercial and light industrial installations. For other applications, please consult Carrier.

INSTALLATION

1. Inspect shipment. Inspect the unit. If it is damaged, or if the shipment is incomplete, immediately file a claim with the shipping company.
2. Check that the local power supply agrees with the specification on the unit nameplate.

Siting the unit

Check the following points:
- The location must be able to support the unit operating weight (see Table 1).
- Allow sufficient space for servicing and air flow around the unit (see Fig. 8).
- Select a location free of dust or foreign matter which may cause coil clogging.
- When installing the unit on the ground, select a site which is not subject to flooding (outdoor unit).
- Consult all applicable rules and standards which govern the installation of air conditioning equipment.
- Both the indoor and the outdoor unit are supplied with transport skids. These skids must be removed, except when vibration absorbers are installed.

Rigging
1. When rigging, use spreaders to prevent damage to the panels. Avoid violent movements.
2. To prevent damage while in transit, do not remove the unit from the skid until it is at its final location.
3. Never roll or tip the unit more than 15°.

IMPORTANT: Make sure that all unit panels are fixed in place before moving. Raise and set down the unit carefully.

Fig. 17 - Rigging (50VZ/PZ)

Fig. 18 - Rigging (38VZ/PZ)

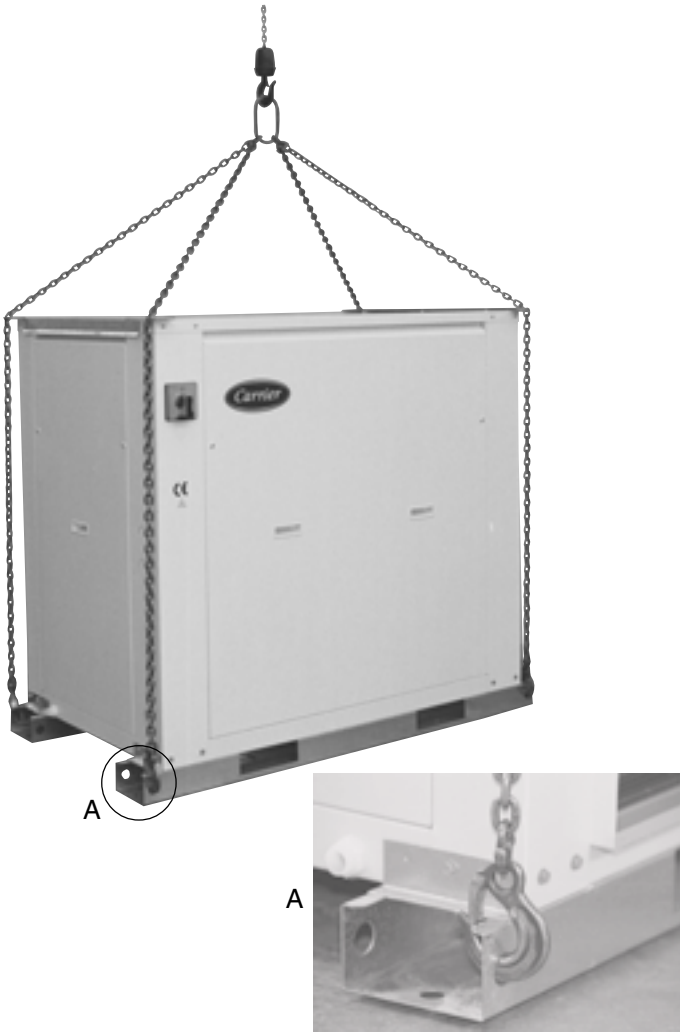
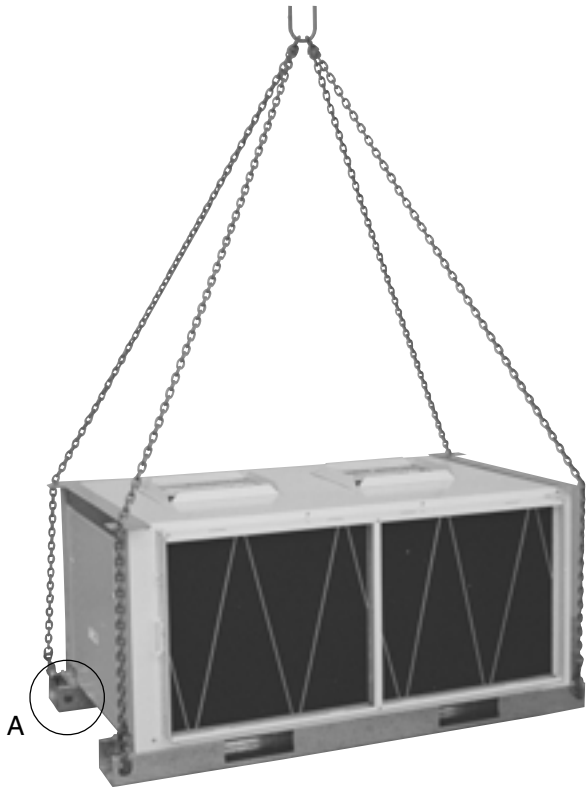


Fig. 19 - Rigging (40PZ)



IMPORTANT: The unit should be correctly levelled.

Ductwork (indoor air discharge)

The ductwork dimensions should be determined in accordance with the air flow to be carried, and the available static pressure of the unit. The different air flows and static pressures which each unit can supply, are shown in the fan performance tables.

It is recommended to observe the following considerations:

- Whatever type of ductwork is used, it should not be made of materials which are flammable, or which give off toxic gases in the event of a fire. The internal surfaces should be smooth, and not contaminate the air which passes through. It is recommended to use sheet metal ducts which are adequately insulated to avoid condensation and thermal leakage.
- At the points where the ducts join the unit, it is recommended to use flexible connections which absorb vibrations, prevent noise inside the ductwork and allow access to the unit.
- Bends near the unit outlet should be avoided as much as possible. If unavoidable, they should be as slight as possible, and internal deflectors should be used when the duct has large dimensions.

NOTE: All duct sizing and design work should be carried out by qualified technicians.

Condensate drainage
50VZ/PZ and 38VZ/PZ units
The indoor unit evacuates condensate water via the condensate pan of the outdoor heat exchanger (38VZ/PZ) which incorporates two male ø 3/4" gas drain connections, one for each side of the unit. Depending on the installation site, either of these drains can be used, and the unused drain should be plugged.

40PZ units
These units incorporate a condensate pan with a drain pipewith an outside diameter of 25 mm.

The connection to the drain pipe can be vertical (Fig. 20) or horizontal (Fig. 21).

- Vertical drain: Remove the prepunched knockout(s) in the unit base.
- Horizontal drain: Remove the prepunched knockout(s) in the side of the unit base.

Fig. 20 - Vertical drain (40PZ)

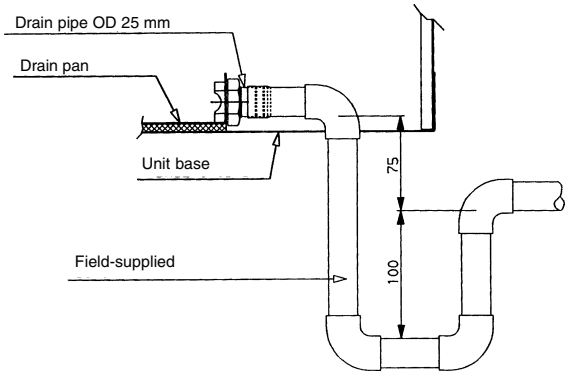
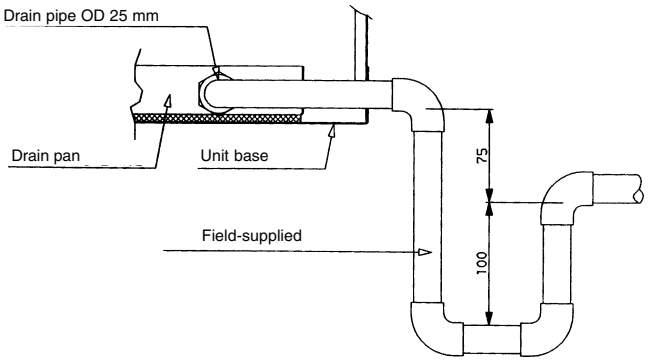


Fig. 21 - Horizontal drain (40PZ)



Electrical connections

WARNING: To prevent electrical shock or equipment damage, make sure disconnects are open before electrical connections are made. If this action is not taken, personal injury may occur.

The unit power supply cables must not be lighter than normal flexible polychloroprene covering cable (designation H05 RN-F).

Route all cables through the conduits incorporated in the unit (50VZ/PZ or 38VZ/PZ) to the main disconnect switch terminals (see wiring diagram).

Voltage to the unit must be within 2% of the voltage and 10% of the current indicated on the nameplate. Contact your local power company for correction of an incorrect line voltage.

Take special care when making the earth connection. This cable must be connected first and it must be longer than the power cable.

WARNING: Operation of the unit on improper line voltage constitutes abuse and is not covered by the Carrier warranty.

IMPORTANT: To ensure the correct power supply, it is necessary to first determine the cable section. This must take into account the unit electrical data (see electrical data table) and the line length (max. permissible voltage drop 5%).

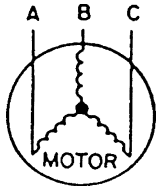
If the unit includes electric heat, this must be taken into account for the supply line sizing.

Never operate a unit if the voltage imbalance exceeds 2%. The following formula must be used to determine the percentage of voltage imbalance.

Voltage imbalance % =

$$\frac{\text{Largest deviation from average voltage}}{\text{Average voltage}}$$

Example:



Nominal supply: 400-3-50

AB = 404 V
BC = 399 V
AC = 394 V

$$\text{Average voltage} = \frac{404 + 399 + 394}{3} = 399 = 400 \text{ V}$$

Determine maximum deviation from average voltage:

AB = 404 - 400 = 4
BC = 400 - 399 = 1
AC = 400 - 394 = 6

Largest deviation is 6 volts. Percentage voltage imbalance is therefore:

$$\frac{6}{400} \times 100 = 1.5\%$$

VERY MPORTANT: The installer must protect the unit power supply line with automatic disconnect devices, a thermal-magnetic switch and a differential disconnect switch, suitable for the installation and in according with applicable legislation.

Electrical connection between the units (38VZ/PZ and 40PZ)

The general power supply for the complete system (indoor and outdoor unit) must be made via the outdoor unit (38VZ/PZ).

Consult the wiring diagram that is supplied with the units. This will show all power connections to be made between the 38VZ/PZ unit and the 40PZ unit.

The unit connection cables must not be lighter than normal flexible polychloroprene covering cable (designation H05 RN-F) with a wire section that is adequate for the 40PZ unit power consumption.

The power supply for the electric heater of the indoor unit must be provided from the main disconnect switch.

Thermostat connection

Thermostat/unit connection must be via a loom (wire section 1 mm^2) manufactured in accordance with the wiring diagram accompanying the unit.

Follow the instructions supplied with the control for thermostat assembly and handling.

The general rules below should be taken into account:

NOTE 1: This control is compatible with any kind of electromechanical or electronic control (without anticipation resistors) with the following features:
- Voltage at 24 V AC

50VZ units standard connections:
R Connection to 24 V
L Protection device indication
C Common 24 V
G Ventilation
Y1 First stage cooling
Y2 Second stage cooling
W1 First stage heating (option)
W2 Second stage heating (option)

50PZ units standard connections:
R Connection to 24 V
L Protection device indication
C Common 24 V
G Ventilation
Y1 First stage (cooling/heating)
Y2 Second stage (cooling/heating)
W1 First stage heating (option)
O Reversing valve*

* The O connection is activated in cooling.

NOTE 2: If the thermostat wiring is incorrect, the control will be blocked (red LED on) and all the outlets will be deactivated when unit power is supplied.
NOTE 3: The thermostat cables should be separate from any 220 V or 380 V cable.

Refrigerant line connections (38VZ/PZ and 40PZ)

To guarantee correct unit performance ensure that the line length and number of bends are kept to a minimum. Avoid pipe kinking by using large radius bends.

IMPORTANT: Always use refrigerant-grade deoxidized and dehydrated copper tubing between the indoor and outdoor units.

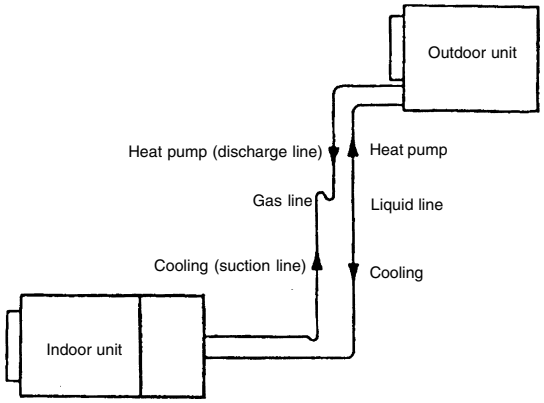
Before connecting the refrigerant lines carefully follow the steps below:
- Remove the nitrogen holding charge from the refrigerant circuits.
- Select the diameter of the copper tubing according the the units installed and according to the distance between the indoor and outdoor units.
- Use silver alloy rod for soldering purposes, and ensure that this work is done in a nitrogen atmosphere.
- To avoid oxidation insulate the refrigerant lines adequately.
- Pull a vacuum in the refrigerant circuit until a pressure of 6.9 Pa is maintained for at least 2 hours.
- Charge the refrigerant circuit with the necessary amount of R-407C refrigerant (in accordance with table 1 and the length of the refrigerant lines).
- Check there are no refrigerant leaks.

Refrigerant line selection

General
When designing refrigerant lines the following must be kept in mind:

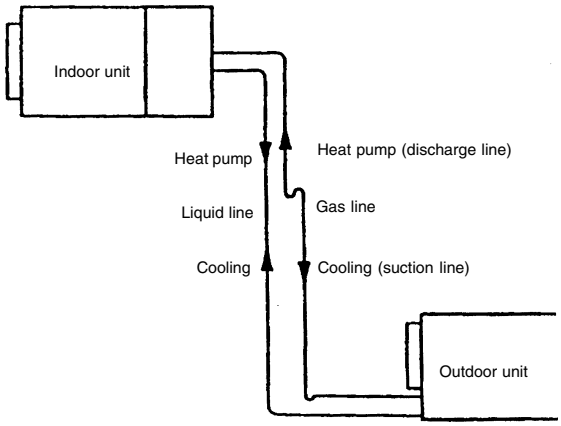
- Depending on the unit arrangement:

Fig. 22 - Refrigerant lines option A



Suction/discharge line:
- A siphon at the base of the vertical pipe run and intermediate siphons every 8 m or oil separators are needed.
- Most unfavourable condition: the suction speed in the vertical pipe run must be more than 6 m/s.

Fig. 23 - Refrigerant lines option B



Suction/discharge line:
- For heat pumps a siphon is required in the base of the vertical pipe run.
- The intermediate siphon can be omitted.
- For cooling only units siphons are not required.
- **Most unfavourable condition:** the suction/discharge speed in the vertical pipe run must be more than 6 m/s.

For both option A (Figure 22) and option B (Figure 23) the following conditions should be observed:

- The maximum speed permitted in any line is 15 m/s.
- Suction line must be insulated and have a 2% slope towards the compressor and the horizontal pipe run.
- In long pipe runs it may be necessary to adjust the oil charge.
- If the liquid line flow is downward, it is necessary to install pressure equalizer for heights above 10 m.
- The liquid should be subcooled by at least 1 K at the restrictor inlet. In this case, if the liquid line flow is upward and the pipe is longer than 15 m, it must be subcooled by 1 K for each 3.5 m in excess of 15 m.
- Subcooling can be contained in the liquid and suction lines (maximum 15 m) of the units.
- For each metre of refrigerant pipe installed, refrigerant has to be added in accordance with table 3.

Table 3 - Refrigerant charge (g/m)

Diameter	1/2"	5/8"	3/4"	7/8"	1-1/8"	1-3/8"
Liquid line	75	120	180	250	420	645
Suction line	14	23	34	47	81	123

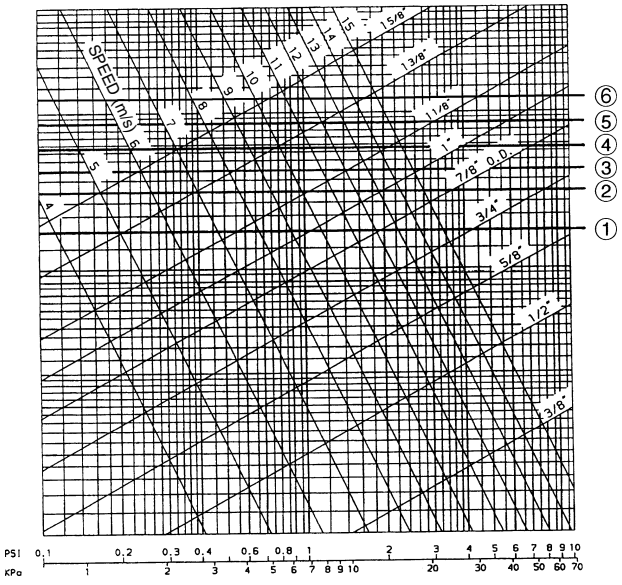
Sizing

Suction/discharge line

The gas line is the suction line in cooling and the discharge line in heat pump operation. Its diameter is calculated for the most unfavourable condition. This can be as a suction or as a discharge line and has to be checked afterwards for the other line type.

For example, in the configuration shown in option A (the suction speed will produce the most unfavourable condition, and the gas line diameter will be calculated for suction. Afterwards, the calculation should be checked for discharge. The diameter calculation for suction and discharge lines is done in the same way using the corresponding drawing (see Figs. 24 and 25).

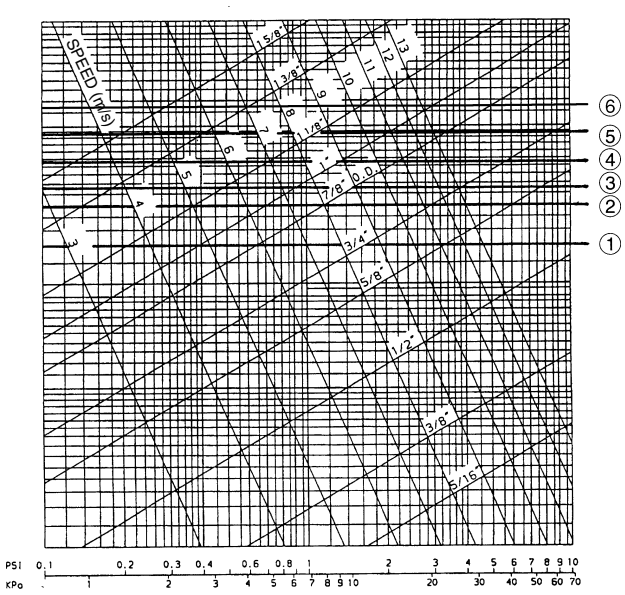
Fig. 24 - Suction line



Legend:

38VZ/PZ 015 + 40PZ 015 38VZ/PZ 031 + 40PZ 031	38VZ/PZ 030 + 40PZ 030 38VZ/PZ 055 + 40PZ 055
38VZ/PZ 040 + 40PZ 040	38VZ/PZ 065 + 40PZ 065
38VZ/PZ 025 + 40PZ 025 38VZ/PZ 045 + 40PZ 045	38VZ/PZ 075 + 40PZ 075

Fig. 25 - Discharge line



Legend:

38VZ/PZ 015 + 40PZ 015 38VZ/PZ 031 + 40PZ 031	38VZ/PZ 030 + 40PZ 030 38VZ/PZ 055 + 40PZ 055
38VZ/PZ 040 + 40PZ 040	38VZ/PZ 065 + 40PZ 065
38VZ/PZ 025 + 40PZ 025 38VZ/PZ 045 + 40PZ 045	38VZ/PZ 075 + 40PZ 075

From Figures 24 and 25, for the selected unit we can obtain the pressure drop corresponding to 10 m of equivalent length for each diameter.

For other equivalent lengths, the pressure drop is obtained in direct proportion. The total pressure drop for the line (sum corresponding to the vertical and horizontal pipe runs) must not be higher than 20 kPa.

Liquid line:

The liquid line diameter can be selected using table 4.

Table 4 - Liquid line

Models	Total equivalent length		
	Up to 10 m	From 10-30 m	From 30-50 m
38VZ/PZ 015 + 40PZ 015	5/8"	5/8"	5/8"
38VZ/PZ 025 + 40PZ 025	5/8"	5/8"	3/4"
38VZ/PZ 030 + 40PZ 030	5/8"	3/4"	3/4"
38VZ/PZ 031 + 40PZ 031	5/8"	5/8"	5/8"
38VZ/PZ 040 + 40PZ 040	5/8"	5/8"	5/8"
38VZ/PZ 045 + 40PZ 045	5/8"	5/8"	3/4"
38VZ/PZ 055 + 40PZ 055	5/8"	3/4"	3/4"
38VZ/PZ 065 + 40PZ 065	5/8"	3/4"	7/8"
38VZ/PZ 075 + 40PZ 075	3/4"	7/8"	7/8"

Necessary checks/precautions before start-up

- Ensure that all electrical connections are properly tightened.
- Ensure that the unit is level and well-supported.
- Check the condition of the ductwork in case damage has occurred during installation.
- The air filter should be clean and in place.
- All the panels should be fitted and firmly secured with the corresponding screws.
- Make sure that there is sufficient space for servicing and maintenance purposes.

- Check the drain connections.
- Ensure that there are no refrigerant leaks.
- Confirm that the electrical power source agrees with the unit nameplate rating.
- Make sure that compressors float freely on the mounting springs.

WARNING: The compressors are mounted on vibration isolators. Do not loosen or remove the support mounting bolts.

- Check for proper fan rotation.

Refrigerant charge

Gas tightness testing and dehydration
50VZ/PZ units are shipped fully charged with refrigerant R-407C ready for operation. If, when the unit is run, symptoms of loss of charge (for example, low pressure switch tripping or abnormally low cooling capacities) are detected, first conduct a leak test followed, if necessary, by a gas tightness test using compressed nitrogen. For the latter all refrigerant must be removed from the circuit. Transfer the refrigerant to a storage tank and then rinse the circuit. For your information, we are listing here some precautions that need to be taken into consideration, when working with these units.

Refrigerant guidelines for R-407C
Refrigerant R-407C consists of a non-azeotropic blend of 23% of R-32, 25% of R-125 and 52% of R-134a, and is characterised by the fact that at the time of the change in state the temperature of the liquid/vapour mixture is not constant. All checks must be pressure tests, and the appropriate pressure/temperature ratio table must be used for the interpretation of the values.

Leak detection is especially important for units charged with refigerant R-407C. Depending on whether the leak occurs in the liquid or the vapour phase, the proportion of the different components in the mixture remaining in the unit is not the same.

The following basic guidelines must be observed:
- Leaks must be repaired immediately by qualified personnel.
- Refrigerant must never be discharged to the atmosphere.
- Use a refrigerant reclaim unit.
- Any loss of oil from the system during maintenance must be stopped immediately and the collected oil must by removed in accordance with applicable regulations

38VZ/PZ and 40PZ units are supplied with a nitrogen holding charge. This must be removed before soldering the connecting refrigerant lines to the unit. Once the soldering has been completed, the complete refrigerant circuit must be evacuated then the correct quantity of R-407C refrigerant for each system must be charged.

WARNING: If any brazing is to be done the refrigerant circuit must be filled with nitrogen. Combustion of refrigerant produces toxic phosgene gas.

VERY IMPORTANT:
- *Never use the compressor as a vacuum pump.*
- *If more refrigerant is needed add gas very slowly via the suction line. Liquid refrigerant must never be introduced into the suction line.*
- *Do not overcharge with refrigerant.*

START-UP

Actual start-up should only be done under the supervision of a qualified refrigeration mechanic. These units include the Master Link II electronic control. The operation of the control is explained in the instructions accompanying each unit.

Initial checks
With the unit in operation, ensure that the values shown on the high and low pressure gauges are within the normal limits. It is advisable to simulate unit shutdown due to high and low pressure, in order to make sure that the pressurestats work properly. To do so, proceed as follows:
- **High pressure shutdown:** Completely cover the outdoor air inlet, or disconnect the outdoor fan and motor. The unit should stop at a pressure of 2844 kPa.
- **Low pressure shutdown**: Cover the indoor air inlet, or disconnect the indoor fan and motor. Observe the low pressure gauge. The unit should stop at a pressure of 265 kPa.

In both cases, after a reasonable time, reset the unit through the remote control as previously indicated.

Check that the motor and compressor consumptions are approximately the same as those shown on the unit nameplate. Consumption data is also given in Table 2.

Refrigerant system description

The refrigerant circuit incorporates the following primary elements:
- **Refrigerant-air heat exchanger:** made of high quality copper tubes and pretreated aluminium fins, for extra corrosion resistance and greater protection than offered by copper fins.
- **Refrigerant lines:** made completely of high quality copper.
- **Expansion valve or metering device**.
- **Compressors:** hermetic reciprocating or scroll compressors depending on model, cooled by suction gas. They incorporate internal protection.
- **Filter drier and Schrader valves.**
- **Safety elements:** high, low pressurestat.
- All units are supplied with the correct refrigerant charge.
- The split system units are supplied with a nitrogen holding charge which must be evacuated and replaced with the right refrigerant charge for the unit size and the connection lines.

Compressor replacement

When an internal fault occurs, the compressor must be replaced. This must be done as detailed below:
- Disconnect the unit from the electrical supply.
- Remove the panels.

- Remove the gas from the refrigerant circuit using recovery equipment to avoid harming the atmosphere.
- Electrically disconnect the compressor.
- Unbraze or unscrew the suction and discharge lines, taking care not to damage the rest of the components.
- Remove the fastenings from the compressor.
- Replace the compressor, ensuring that it contains sufficient oil.
- Braze or screw in the lines.
- Connect the compressor according to the wiring diagram.
- Evacuate the compressor.
- Fill in the refrigerant charge indicated on the nameplate, plus the required charge for the refrigerant connection lines, if the system is a split system.

NOTE: This operation must be done by a qualified technician.

Description of unit protection devices

The unit includes the following unit protection devices:
- **Internal compressor protector** to avoid overheating.
- **Short-cycle protection** (included in the main electronic board).
- **Outdoor fan motor thermomagnetic switch.**
- **Indoor fan motor thermomagnetic switch.**
- **High pressurestat** - This protects the unit against excessive condensing pressure. The high pressurestat has factory-fixed non-adjustable settings. To check, see section Initial checks.
- **Low pressurestat** - This protects the unit against excessive low pressure in the evaporator. The low pressurestat has factory fixed non-adjustable settings. To check, see section Initial checks.

CAUTION: When any of these cuts out, the unit stops and will not re-start until the contacts have been reclosed after rectification of the fault.

Table 5 - Pressure switch settings

	Cut-out	Cut-in	Reset
High pressurestat	*2844 kPa	1863 kPa	Automatic
Low pressurestat	*265 kPa	363 kPa	Automatic

* Factory-fitted

WARNING: Alteration of factory settings other than the design set-point, without manufacturer's authorisation, may void the warranty.

Operating limits

These units have been designed to operate within the following limits:

Table 6 - Cooling operation

Zone	Air temperature Dry bulb	Wet bulb
Indoor		
Maximum	35°C	21°C
Minimum	19°C	14°C
Outdoor		
Maximum	46°C	-
Minimum	19°C*	-

* With the optional head pressure control, the unit can operate with temperatures below 19°C.

Table 7 - Heat pump operation

Zone	Air temperature Dry bulb	Wet bulb
Indoor		
Maximum	27°C	-
Outdoor		
Maximum	24°C	18°C
Minimum	-15°C	-

OPTIONS AND ACCESSORIES

	Option	Accessory
Head pressure control kit	x	x
Electric heating	x	x
Compressor crankcase heater (standard on 50PZ)	x	x
Hot water coil	x	x
Economizer		x
Outdoor air filter	x	x
User interface	x	
Protection grille	x	x
Minimum opening potentiometer	x	x
Volt-free contacts	x	
Optional communications	x	x
Return air sensor	x	x
Superior drive	x	
38VZ/PZ for vertical discharge	x	

Hot water heating coil

This option/accessory consists of the water heating coil, the air flow equalising plate, the side access panel and fixing components.

The heating coil performances are in accordance with Eurovent conditions and are shown in tables 8 and 9.

Table 8

Unit		015	025	030	031	040	045	055	065	075
Heating capacity	**kW***	9.6	17.5	19.6	19.6	27.3	33.4	35.3	41	43.8
Water flow	**l/s**	0.46	0.84	0.94	0.94	1.31	1.60	1.69	1.96	2.09
Pressure drop	**kPa**	13	20	14.5	14.5	13.5	21	23	33.5	37.5

* Indoor air temperature 20°C and entering/leaving water temperature 50°C/45°C.

Table 9

Unit		015	025	030	031	040	045	055	065	075
Heating capacity	**kW***	15.2	27.9	30.4	30.4	43.4	51.5	54.6	63.9	68.5
Water flow	**l/s**	0.36	0.67	0.72	0.72	1.04	1.23	1.31	1.52	1.64
Pressure drop	**kPa**	9	13	9	9	9	13	14.5	21	24

* Indoor air temperature 20°C and entering/leaving water temperature 70°C/60°C.

Water connection

The entering and leaving water connections are all threaded male gas connections with the diameters shown in Table 10.

Table 10

Unit	015	025	030	031	040	045	055	065	075
Ø connection	1"	1"	1-1/4"	1-1/4"	1-1/4"	1-1/2"	1-1/2"	1-1/2"	1-1/2"

Installation

The standard installation of the water heating coil is made by positioning the connection manifolds on the same side as the motor of the evaporator unit. If necessary, it can be connected to the opposite side. In this case the coil must be turned by 180°.

The installation sequence is as follows:

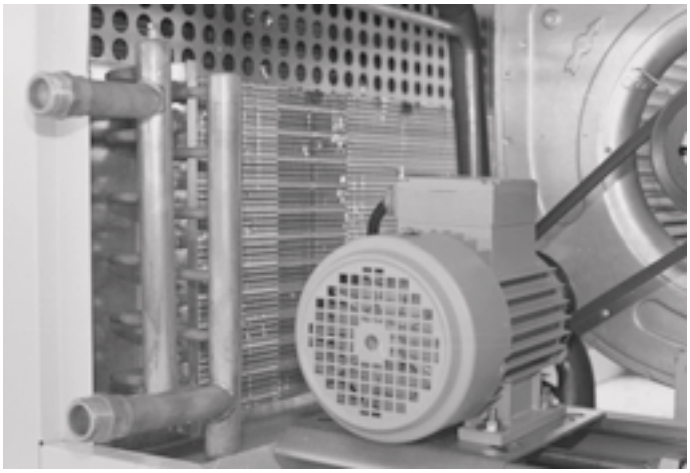
a. Disconnect the power supply to the unit.
b. Remove the side access panels.
c. Loosely screw in the 4 screws provided to attach the heating coil to the headers of the evaporator coil (leaving a free space of 3-4 mm untightened).
d. Install the heating coil, inserting the semi-attached screws in the grooves of the headers.
e. Fix the 4 screws provided to attach the heating coil.
f. Install the perforated plate in the upper part of the coil, covering the space that remains between the coil and the unit top panel.
g. Connect heating coil sensor BT4 to terminals 39 and 40 of the indoor unit terminal box, and from here to terminals 39 and 40 of the outdoor unit.
h. Change the position of dipswitch 3 on the main board AO to position "ON".
i. For water heating coils with a proportional valve an extension board A2 must be installed and connected in accordance with the wiring diagram for this option. **In all cases, both for the all-or-nothing control valve and for the proportional valve the elctrical conections must be made in accordance with the wiring diagram.**
j. Install the blanking plate, supplied with the coil, on the corresponding side, after punching out the prepunched holes for the entering and leaving water connections of the manifolds.

Table 11

Model	Unit	015	025	030	031	040	045	055	065	075
6 kW	Cooling only	x								
	Heat pump	x								
12 kW	Cooling only	x	x	x						
	Heat pump	x	x	x	x	x				
15 kW	Cooling only		x	x						
	Heat pump		x	x	x	x				
18 kW	Cooling only									
	Heat pump						x	x	x	x
18 (9+9) kW*	Cooling only				x	x				
	Heat pump									
24 (12+12) kW*	Cooling only					x	x	x	x	
	Heat pump									

* 2-stage heating

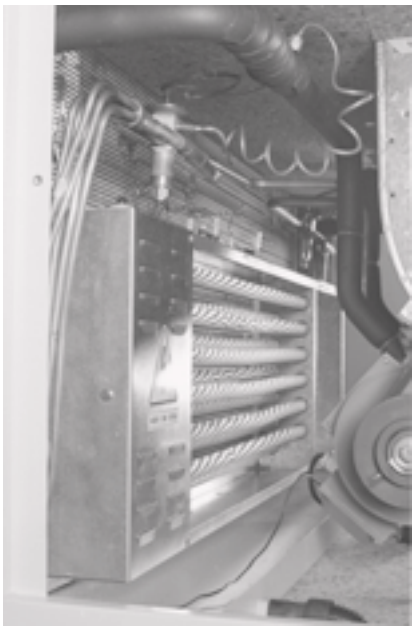
Fig. 26



Electric resistance heaters

This option/accessory consists of a frame with shielded electric heaters and a control box, incorporated in the same frame, with all electrical and protection components required to guarantee total safety. For the available capacities see Table 11.

Fig. 27



Installation

The standard installation of the electric heating coil is made by positioning the control box on the same side as the motor of the evaporator unit.

If necessary, it can be positioned on the opposite side. In this case the coil must be turned by 180°.

VERY IMPORTANT: If the coil is installed on the opposite side, it is NECESSARY to change the position of the two thermal protectors to the opposite longitudinal beam, i.e. the thermal protectors must always be positioned in the upper part of the coil.

The installation sequence is as follows:

a. Disconnect the power supply to the unit.
b. Remove the side access panels.
c. Loosely screw in the 4 screws provided to attach the electric heater to the headers of the evaporator coil (leaving a free space of 3-4 mm untightened).
d. Install the electric heater, inserting the semi-attached screws in the grooves of the headers.
e. Fix the 4 screws provided to attach the electric heater.
f. Make all electrical connections in accordance with the wiring diagram supplied with this option.
g. Install the blanking plates in their correct positions.

GENERAL MAINTENANCE

ATTENTION: Before starting any servicing or maintenance operation on the unit, make sure that the power supply has been disconnected. A current discharge could cause personal injury.

In order to obtain maximum performance from the unit special attention should be paid to the following points:

- **Electrical connections:** The supply voltage should be ±10% of the nominal voltage limits.

  Ensure that no faulty contacts exist in the terminal blocks, contactor boards, etc. Make sure that all the electrical connections are properly tightened, and that all the electrical components (contactors, relays, etc) are firmly secured to the corresponding rails.
  Pay special attention to the condition of the connecting cables between the control elements and the electrical box, and to that of the unit power supply cable. They should not be twisted and there should be no slits or notches in the insulation. Check the starting and running consumptions are within the limits specified in the corresponding technical information.
- **Drainage:** Frequently check that the drain is not obstructed, and that the condensate pan is clean and level.
- **Inlet air filter:** This should be cleaned periodically. The frequency depends on the purity of the entering air. The filter may be cleaned with a household vacuum cleaner, or by immersing it in water.
- **Refrigerant circuit:** Ensure that there is no leakage of refrigerant or oil from the compressor. Check that the high and low side operating pressures are normal. Make sure that the coils are not dirty. If necessary an optional filter may be placed at the outdoor air inlet. Check for unusual compressor noise.
- **Controls:** Check the operation of all electric controls, high and low pressurestats, etc.

SERVICE

Indoor fan air adjustment

The drive is factory set in accordance with the tables on pages 18-25. When indoor pressure and air flow requirements differ from nominal ratings, the motor pulley can be adjusted for different available static pressure values.

To change the fan speed (see Fig. 28):

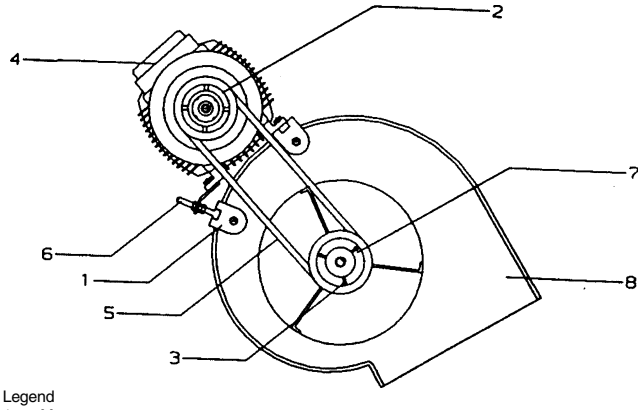
1. Move the motor along its track in order to remove the belt.
2. Loosen the pulley setscrews and rotate as necessary.
3. Tighten the setscrews .
4. Replace the belt(s) in the channel of the pulley.
5. Tighten the belt(s), using the tension screw nut and washer .

To align fan and motor pulleys:

1. Loosen fan pulley setscrews. Slide fan pulley along the pulley shaft and align with the motor using a ruler, making sure that it is parallel to the belt.
2. Tighten the fan pulley setscrews.

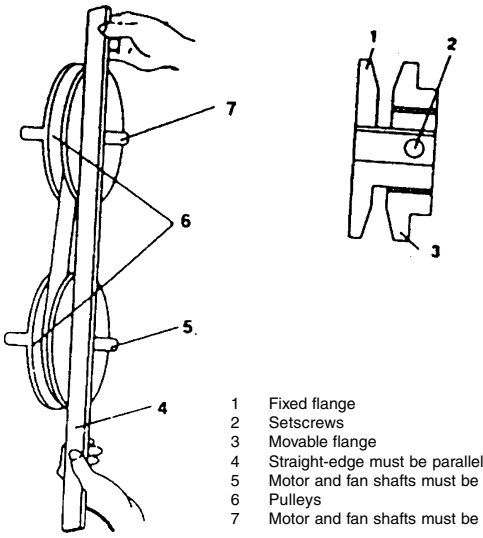
To adjust the belt tension, loosen the motor mounting plate bolts and slide the motor mounting plate until the belt is as shown in Fig. 29.

Fig. 28 - Fan speed adjustment



Legend
1 Motor support
2 Motor pulley
3 Setscrews
4 Motor
5 Belt
6 Tensioning screw
7 Fan pulley
8 Fan scroll

Fig. 29 - To align fan and motor pulleys



1 Fixed flange
2 Setscrews
3 Movable flange
4 Straight-edge must be parallel with belt
5 Motor and fan shafts must be parallel
6 Pulleys
7 Motor and fan shafts must be parallel

Lubrication

Both the motors and the fans have factory lubricated and sealed bearings, and need no further lubrication.

The compressor has its own oil supply and oil should not be added unless a leak has occurred.

Servicing recommendations

- Before replacing any of the elements in the cooling circuit, ensure that the entire refrigerant charge is removed from both the high and low pressure sides of the unit.
- The control elements of the cooling system are highly sensitive. If they need to be replaced, care should be taken not to overheat them with blowlamps whilst soldering. A damp cloth should be wrapped around the component to be soldered, and the flame directed away from the component body.
- Silver alloy soldering rods should always be used.
- If the total unit gas charge has to be replaced, the quantity should be as given on the nameplate and the unit should be properly evacuated beforehand.
- During unit operation all panels should be in place, including the electrical box access panel.
- If it is necessary to cut the lines of the refrigerant circuit, tube cutters should always be used and never tools which produce burrs. All refrigerant circuit tubing should be of copper, specially made for refrigeration purposes.

Transformation to split system (50VZ/PZ units)

All units can be changed from a packaged to a split system, as described below:

- Disconnect the unit from the power supply.
- Remove the compressor access panel(s) and the indoor unit access panel(s).
- Recover the complete refrigerant charge from the high and low pressure sides of each refrigerant circuit, and then create a light vacuum to prevent possible accidents.
- From the indoor unit at the conduit drill hole remove the neoprene insulation from the suction line(s) until you find the welded joint of both line sections (approximately 70 mm from the base of the indoor unit). Similarly locate the welded joint of the liquid line sections. Separate both lines (suction and liquid lines) by unsoldering them. After completing this operation, plug the ends of both lines to avoid the possible entry of foreign matter.
- Loosen the indoor fan motor supply cable sleeve. Remove the sleeve.
- Remove the air filters.
- Loosen the screws and nuts that join the two sections (indoor and outdoor) inside the unit and separate them carefully, to avoid damaging the refrigerant line ends.
- Connect the refrigerant lines as described earlier in the text.
- Make the electrical connections.

FINAL RECOMMENDATIONS

The unit you have purchased has undergone strict quality control procedures before leaving the factory.

All components, including the control systems and electrical equipment, etc., are certified by our Quality Control Department, and tested under the harshest possible operating conditions in our laboratories. However, after leaving the factory, it is possible that one or more of these elements may be damaged due to causes beyond our control. In such an event, **the user should not work on any of the internal components, or subject the unit to operating conditions which are not specified in this manual,** since serious damage may result and the guarantee would be invalidated. Repair and maintenance work should always be left to the installer.

All recommendations concerning unit installation are intended to be as a guideline. The installer should carry out the installation according to the design conditions and should comply with all applicable regulations for air conditioning and refrigeration installations.

NOTE: The manufacturer does not accept responsibility for any malfunctions resulting from misuse of the equipment.

TROUBLESHOOTING CHART

A list of possible faults, as well as the probable cause and suggested solutions is shown in Table 12. In the event of a unit malfunction it is recommended to disconnect the power supply and ascertain the cause.

Table 12 - Troubleshooting chart

Symptoms	Cause	Remedy
Unit does not start	No power supply	Connect power supply
	Main switch open	Close switch
	Low line voltage	Check voltage and remedy the deficiency
	A protection has tripped	Reset
	Contactor stuck open	Replace contactor
	Seized compressor	Replace compressor
Unit starts and stops frequently	Defective compressor contactor	Replace contactor
	Defective compressor	Replace compressor
	Refrigerant losses	Reclaim the charge, pull a vacuum, recharge the system with the quantity indicated on the name plate
Unit continuously cuts out at low pressure	Defective low pressurestat	Replace pressurestat
	Refrigerant losses	Check and add the necessary quantity
	Indoor fan does not operate	Check fan motor
Unit continuously cuts out at high pressure	**COOLING CYCLE:**	
	Defective high pressurestat	Replace pressurestat
	Blocked filter drier	Replace filter
	Outdoor fan does not operate	Check fan motor
	HEATING CYCLE:	
	Defective high pressurestat	Replace pressurestat
	Indoor fan does not operate	Check fan motor
Abnormal system noise	Piping vibration	Support piping
	Noisy compressor	Check and change if necessary
	Badly fitting panels	Install correctly
Compressor loses oil	Leak in system	Repair leak
Water loss	Defective drainage connections	Check and tighten if necessary

Carrier
Order No. 15021-20, 11.2000. Supersedes order No.: New
Manufacturer reserves the right to change any product specifications without notice.
Printed on Totally Chlorine-Free Paper.
Printed in the Netherlands
AM-036918